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THE

Journal of the Society of Arts,

AND OF

THE INSTITUTIONS IN UNION.

110th Session.] FRIDAY, FEBRUARY 12, 1864. [No. 586. Vol. XII.

Announcements by the Council.

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Address to His Royal Highness the President.

The following Address of Congratulation has been forwarded for presentation to His Royal Highness the President:—

To His Royal Highness the Prince of Wales, K.G.

May it please Your Royal Highness,

We, the Society for the Encouragement of Arts, Manufactures, and Commerce, respectfully approach Your Royal Highness, as our President, to offer our sincere congratulations on the birth of a son.

We trust that this event will tend to enhance the happiness of yourself and your Royal Consort, and that the heir born under such bright auspices may prove an honour and a blessing to his Royal Parents, as well as to the nation at large.

Sealed with the Seal of the Society, this 10th day of February, 1864, in the presence of

P. LE NEVE FOSTER,
L. S. *Secretary.*

Ordinary Meetings.

Wednesday Evenings, at 8 o'clock.

Feb. 17.—"On Public and Private Dietaries," a sequel to the paper read on the 16th December last. By Dr. Edward Smith, F.R.S.

Feb. 24.—"On Petroleum, its Economic Value, and a Visit to the Petroleum Wells of Canada." By Dr. Marcet, F.R.S.

March 2.—"On the Verification of Olive Oil, by means of its Cohesion Figure." By Charles Tomlinson, Esq., Lecturer on Science at King's College School.

Cantor Lectures.

Courses of Lectures on the following subjects are arranged for the present Session:—

The Operation of the Present Laws of Naval Warfare on International Commerce. By G. W. Hastings, Esq., Barrister-at-Law (already delivered).

Fine Arts Applied to Industry. By W. Burges, Esq.

Chemistry Applied to the Arts. By Dr. F. Crace Calvert, F.R.S.

The second lecture of Mr. Burges's course will be delivered on Monday next, the 15th inst.:—

Feb. 15.—Lecture II.—*Glass.*—Antique glass, Venetian glass, modern glass (Powell, Chance, &c.); Mediæval stained glass; modern ditto; Mediæval enamels; modern ditto; (Legoste of Paris.)

Feb. 22.—Lecture III.—*Pottery.*—Etruscan vases (Wedgwood); Italian majolica (Minton); Sèvres china; modern biscuit.

Feb. 29.—Lecture IV.—*Iron and Brass.*—Antique bronzes; Mediæval ditto; modern French bronzes (Barbédienne); Mediæval dinanderie; modern ditto (Hardman, Hart, &c.); Mediæval and Renaissance wrought iron; modern ditto; cast iron.

Mar. 7.—Lecture V.—*Gold and Silver.*—Antique and Mediæval plate; modern ditto (Elkington); Antique and Mediæval jewellery; modern ditto; Antique and Mediæval coinage; modern ditto.

Mar. 14.—Lecture VI.—*Furniture.*—Mediæval furniture, oak and painted; Renaissance; 16th and 17th centuries; modern.

Mar. 21.—Lecture VII.—The Weaver's art; Mediæval, Eastern, modern.

The Lectures will begin on each evening at 8 o'clock.

The Christmas subscriptions are now due, and should be forwarded by cheque or post-office order, made payable to the Financial Officer, Samuel Thomas Davenport. All cheques and post-office orders should be crossed through Messrs. Coutts and Co.

Proceedings of the Society.

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CANTOR LECTURES.

Fine Arts Applied to Industry. By W. Burges, Esq.

First Lecture, Monday, Feb. 8.—Introductory.

Mr. Burges, after observing that the only way of exercising an influence on the progress of art was the application of it to objects made in great quantities for every-day use, and after adducing the example of the Greeks in this respect, proceeded to comment on the unwillingness in certain quarters to make a legitimate use of machinery, one great mission of which was defined as the reduction of pounds to shillings, and of shillings to pence. This prejudice was referred to a misunderstanding of the teaching of Mr. Ruskin and of the late Mr. Pugin, whereas the real object of these gentlemen was the discouragement of mechanical appliances to objects where life and variety were particularly wanted. After bringing forward some instances where, by a proper use of such appliances, really artistic objects might have been produced at a price exceedingly below their present cost, the lecturer proceeded to congratulate the English manufacturers on the great improvements manifested of late years. In support of this he quoted the opinion of M. le Comte Clement de Ris, a gentleman sent over last year by the French Government to study the Soane Museum. M. de Ris advised "the French manufacturers, if they do not wish to find in 10 years' time powerful rivals where hitherto they have only met humble tributaries, by no means to sleep upon their laurels." This progress was pronounced to be due to the general development of art, and, above all, to the Schools of Design and the admirable museum at South Kensington. The principal impediments to our future progress were then noticed, the most formidable of all being the want of a distinctive architecture. This affected all branches of design, inasmuch as the student had to learn half-a-dozen different styles and their various details, the consequence being that he mastered none of them thoroughly. Want of colour in our costume was then brought forward as another great impediment, the eye of the designer being naturally influenced by the colours he habitually saw around him. Lastly, the comparative great neglect of figure drawing was noticed as a deficiency very much to be lamented. The remedies for the present state of things, in the lecturer's opinion, were then enumerated. These were the extension of the Government schools of design, both in London and the provinces—the establishment of local museums, the contents of which should be periodically changed—the incorporation of the Mediæval department of the British Museum with the Kensington collection, and the subsequent removal of the whole to some central situation, say Charing-cross; and, above all, the bringing up a race of designers and artizans who should be, if possible, as well versed in the drawing of the human figure as those of the sixteenth century.

Ninth Ordinary Meeting.

Wednesday, February 10th, 1864; Lord Elcho, M.P., in the chair.

The following candidates were proposed for election as members of the Society:—

Cameron, Robert M., Canning-house, Edinburgh.
Defries, Daniel N., 5, Russell-place, Fitzroy-square, W.
Grant, Albert, Roseau-house, Addison-road, W.
Huntsman, Henry, 126, New Bond-street, W.
Kempton, Henry Tattersall Knowles, 17, Cavendish-place, W.
Travers, Archibald, 19, St. Swithin's-lane, E.C.
Westmacott, Percy, Whickham, Gateshead-on-Tyne.

The following candidates were balloted for and duly elected members of the Society:—

Goodliffe, Francis Gimber, Cecil-house, Cheshunt, Herts.
Goodyear, George Edward, Club Chambers, 15, Regent-street, S.W.
Grindley, Robert Dutton, Cambridge-lodge, South Fields, Wandsworth, S.W.
Kidd, John, 7, Wine Office-court, Fleet-street, E.C.
Offor, George, jun., 115, Leadenhall-street, E.C.
Walmsley, Henry Benjamin, The Elms, Acton, W.

The Paper read was—

ON FRESCO PAINTING AS A SUITABLE MODE OF MURAL DECORATION.

By J. Beavington Atkinson, Esq.

Twenty years ago the Royal Commissioners on the Fine Arts determined that fresco painting might be applied with advantage to the decoration of the Houses of Parliament. The benefits then promised from the adoption of the process have, either by fatality or fault, failed in realization. After labours extending well-nigh over a quarter of a century, the commission is dissolved, the frescoes are in decay, and a new method, imported from Germany has obtained the ascendancy. The frustration of hopes reasonably entertained, that in the revival of fresco painting a new and great era was about to dawn on our national arts, now comes as little less than a calamity on the country. It had been thought that a mode of mural painting which the practice of the greatest artists of the middle ages had proved to be durable, economical, and architectonic, might, with success, in these our modern times, be applied to the internal decoration of public and municipal buildings in the metropolis and provincial cities. I repeat that any disappointment of this well-grounded anticipation must be regarded by architects, painters, and art workmen as no less than a calamity, for it is manifest that if we allow a hostile verdict to be given against fresco painting, a large field which was open to an art development high in style and popular in the wide area of its teaching and appeal, becomes practically closed. I, for one, will rebel against any such fatal judgment. The hostile verdict, if verdict there be, has been founded on partial and insufficient evidence, and I think that good service will be done to the cause of noblest art by the attempt which I shall now proceed to make, to marshal concisely and clearly the facts of this fresco trial, just as they are. It will be seen that the experiment was not made in England until after mature deliberation. It will be shown that any failure or decay in the frescoes executed at Westminster is partial, and within the reach of remedy; and the conclusion, we believe, will come as irresistible, that the method which, in the hands of Raphael and Michael Angelo was the vehicle for the noblest thoughts, is still an art fitted for all time, in which the arm that is strong will rejoice, and the mind that is large must glory.

It is scarcely needful that the well-known process of fresco should be described. In order, however, the more clearly to comprehend the facts of the case as they at present stand, a short explanation may be desirable. I will call your attention, then, to three several important points in which frescoes contrast with oil painting and easel pictures. First, as to the material or surface upon which the artist works. Easel pictures are painted upon panel or canvas, the recipient surface being dry. In contrast, frescoes are painted on a wall, the surface of which is wet; hence the term fresco—fresh, or newly laid. This is the fresco *buono* or *puro*. However, the practise of the Italian masters admitted of certain latitude. A large composition, for example, might, in the first place, be laid down, in its breadth and simplicity, upon the mortar while moist, and then touched up and finished when dry by the secco or tempera process. And this liberty which the artists of the middle ages were permitted, ought, I think, to be, and indeed has been, extended to our modern practitioners. Accordingly, I I shall feel justified in using the term fresco in its more popular and extended sense—as a mural painting begun upon the mortar while wet, but oft-times elaborated and finished after the wall has become dry. This, and possibly other minor modifications, were in the original fresco eras of Italy, as in the modern and revived epoch in Europe, matters of personal convenience and nothing more. Certain artists, of sure and rapid hand, had found themselves, even in the first sweep of the brush, certain of the desired result, and hence their works would need no retouching. But other painters, more sensitive and timid, discovered that it was needful to revise their compositions, even as an author his proof-sheet prior to publication. By such retouching and revision, however, when kept within legitimate limits, the original thoughts and style of the painter or writer suffer no absolute reversion. In other words, the fresco, in its largeness of treatment, in its immunity from surface gloss or varnish, in its brilliancy and power to give off light, is scarcely to an appreciable extent prejudiced. But I think it is generally admitted, that the less of secco retouching the better; and I have no hesitation in saying that some of the frescoes in the Houses of Parliament have, by the inordinate laying on, probably both in fresco and secco, of opaque body colour, lost the transparency and the pure liquid quality by which the lovely works of the best Italian masters are distinguished.

Easel pictures, as I have said, are on panel or canvas; fresco-paintings upon wall; and this difference in first foundation involves a corresponding contrast in the causes which secure durability or accelerate decay. Canvas may rot; worms eat away a panel; and not less does the mortar, in its constituents of sand and lime, become subject to chemical agencies which conspire for the picture's overthrow; and these agencies, which were not in abeyance in the middle ages, are of course active still. They have occasioned, as we shall see, the partial destruction of the frescoes at Westminster, as they had already wrought the demolition of like works in Italy. But this failure, when it overtook the painter of old, only served as a caution to greater care: never was it permitted to annul a method which in the hands of genius had been proved capable of grandest results. A like persistency in the pursuit of a noble end would well become our English artists.

I have first spoken of the material or surface upon which the fresco is painted. I would now secondly, in few words, direct your attention to a question no less vital—with what colours shall the fresco painter lay his palette?

Sir Joshua Reynolds said he was convinced the ancients were great colourists, because the colours they used were few and simple. The same argument might be adduced in favour of the Italian fresco painters. In fact, the multitude of pigments which are permissible in oils become greatly circumscribed in fresco. The conditions indeed which obtain in the processes of oil and of fresco are widely different. In mural paintings the colours sink into the mortar, and ought to be durable as the wall itself. In this amalgamation, however, they have to submit to a fiery test. The lime lays hold of the weaker sort and blanches their lustre; therefore is it necessary that unchanging earths and minerals should be chosen, that vegetable and animal dyes, however alluring, that artificial and compounded pigments which may be subject to decomposition, should be discarded. It is desirable, in short, that the fresco painter in simplicity should trust nature and not the colour-man, that he should take the earth from the ground and the mineral from the mine, just as the rains of heaven may have washed them, or the fire of the volcano may have tried them in the furnace; and the probability then is that the colours which have endured the heat and the cold, the wind and the rains of ages, will not vanish when handed over to the convent cloister or the palace hall. Nevertheless, some of the colours adopted by the middle-age painters, though wise in their generation, have gone, and some used by our modern artists have in like manner perished. This, in the nature of things, was to be expected. But such small misfortunes should, as we have said, impose greater vigilance, should nerve to effort, not enervate for defeat. A great art which has in past times been practised with signal success, must not be abandoned with the timid cry of surrender. For myself I do not join in the oft-repeated lament over the "lost arts." Assuredly with the manifold resources of science at our command, we can find more than an equivalent for all that has been lost. The fresco painter need not fear that materials will be wanting. No great art in the history of the world has become extinct from the lack of paints or brushes; but many strong and noble schools have perished from the incompetency of professors and from degeneracy in the taste of the people.

One more generic distinction of the art of fresco painting I would mention before passing to the specific experiments which have been made in this country. We have spoken of the mortar, wet or dry, which receives the picture. We have insisted on the simplicity of the pigments suited to the fresco process. And now, thirdly, we will say a word not on the material, but on the location, of these fresco paintings. Easel pictures, whether on canvas or panel, are moveable and itinerant; mural pictures are attached to the freehold, and are thus fixtures, and form part and parcel of the real estate. In the commerce of art, then, easel pictures may be deemed of the nature of goods and chattels; as personalty, which may pass from hand to hand; moveable stock, that can be put in transit from town to town, seeking house-room anywhere and everywhere. But fresco paintings, in contrast, as we have said, are inseparable from the freehold; they are heirlooms, which pertain to tenures and hereditaments; they are real property, which cannot be included in probate or touched by executor. And thus, in the commonalty of art, works executed in fresco stand in perpetuity as the heritage of ancient families; as a princely or noble lineage, they have taken hold of castle precincts, and abide from generation to generation. In hall and banqueting room they maintain a stately presence; tenants and retainers come and go, the flood of life passes by, but as long as the lordly palace lasts these memorials of ancient days depart not. And therefore has it always been held that, over and above the value which might inhere to easel painting, there was to fresco something superadded of paramount nobility. Fresco, as we have seen, is attached to the freehold, and consequently is inseparable from architecture, the earliest and the grandest of arts; and this, its indissoluble union with the stately art of construction, imposes severe conditions and qualifies for highest functions. These requirements and prerogatives I can now stop merely to indicate in fewest words. Suffice it to say, then, that fresco paintings, like the architecture which is their framework, should be simple in treatment, symmetric in proportion, broad in distribution of distinctive members and masses; that the theme chosen should have the element of greatness; that the truths embodied should be as enduring as the tenement they adorn; that details small, that thoughts trivial, and that methods meretricious, should find no place in that high and ancient art which Giotto, Orcagna, Signorelli, Michael Angelo, and Raphael, have raised to majesty and stamped with essential truth.

Such being the inherent dignity and worth of fresco, we cannot be surprised that the Royal Commissioners of Fine Arts, with the Prince Consort as their chief, should have deemed the adoption of the process as singularly suited to the decoration of great national buildings, a method, let me add, which could receive no more timely revival than at the period when architecture, taking to renewed development, craved from sculpture and painting consonant aid—a style which by its largeness and by the extent of its historic range seemed peculiarly fitted to impart to our English school a much needed power, mastery and grandeur.

Accordingly a trial of the ancient art of fresco was, as we all know, made under high auspices, in the Palace of Westminster. I have just closed a rapid survey of the process in general, and now proceed to the details of the actual experiment which has been made in this country.

In the year 1841, a select Committee was appointed by the House of Commons "to take into consideration the promotion of the Fine Arts in this country, in connection with the rebuilding of the Houses of Parliament." In this same year the Committee stated, in their printed report, that they had "obtained the opinions of some very distinguished professors and admirers of art, who were unanimous upon one point, viz., that so important and national a work as the erection of two Houses of Parliament afforded an opportunity, which ought not to be neglected, of encouraging, not only the higher, but every subordinate branch of Fine Art in this country." The Committee, writing more than twenty years ago, say that to one of the Fine Arts in particular, which indeed had scarcely been known in this country, they had directed special inquiry. "Fresco painting," they tell us, had then "lately been revived on the continent, and employed in the decoration of public buildings, especially at Munich." Sir Charles Eastlake, Mr. Dyce, and others, held the opinion that fresco was to be preferred to oil, from its superior fitness to all situations, from its peculiar power of giving off light, and by virtue of its greater durability. It was further the judgment of the highest authorities that fresco paintings would greatly enhance the decorative beauty of the Houses of Parliament, and that the acquisition of the process, hitherto unknown to our artists, could scarcely fail to impart to the English school power in drawing, and grandeur in design and composition.

Accordingly, we cannot be surprised to learn from the report, presented to the House of Commons on June 18, 1841, that "your Committee having carefully considered the evidence, are disposed to recommend that the style of fresco painting should be adopted." In compliance with a further recommendation of the Committee, was inaugurated in the following year the Commission on the Fine Arts, appointed expressly to superintend the decoration of the Houses of Parliament, and to assist the Government in the conduct of all incidental investigations. The subsequent line of action taken by this imperial body will be within the memory of most of us. The Commissioners, in the first place, wisely determined to test the ability of our British artists by two successive competitions—one of cartoon drawings, the other of fresco paintings—the works executed being, it will be remembered, submitted to public scrutiny in Westminster Hall. The Commissioners in their third Report, dated Whitehall, July 9, 1844, humbly state to her Majesty that the exhibition referred to had taken place, and that, considering the inexperience even of the best artists in the practice of fresco-painting, they were satisfied with the promise of superior skill which had been afforded; and they were of opinion that several of the specimens of fresco-painting which had been so submitted to them, taken together with the cartoons before exhibited by the artists, or with other existing evidences of their talents, justified them in suggesting further measures, with a view to the execution of fresco-paintings in portions of the Palace of Westminster. Accordingly, we find, in 1845, the Commission for the first fresco in the House of Lords—the Baptism of Ethelbert—was entrusted to Mr. Dyce.

The Commissioners, it is worthy of remark, proceeded with commendable caution. Referring to their next report, dated 1846, we find them still apprehensive that want of experience on the part of British artists might involve the revived process in partial failure. "We have, however," write the Commissioners, "the satisfaction to state that the work entrusted to Mr. Dyce presents no evidence of such imperfections; that, on the contrary, it evinces great knowledge of fresco-painting and great skill in its application; that, further, as regards the effect of fresco-painting in the locality, we consider that it promises to agree well with the architectural and other decorations therein adopted or to be adopted. We therefore beg leave to confirm our former recommendation, and to propose that the remaining five compartments in the House of Lords shall be decorated with fresco-paintings when the several designs for the same shall have been approved." These five compartments were committed to Mr. Maclise, Mr. Cope, and Mr. Horsley; and the Commissioners, in their eighth report, dated 1848, give the following testimony in favour of the process they had sanctioned:—"We consider," write the Commissioners, "that the three works already executed, the designs for which had been before approved by us, are highly satisfactory as examples of fresco-painting; their effect confirms us in the opinion that, under certain circumstances of light and distance, fresco-painting is well calculated for the purpose of decoration; while from requiring the preparation of careful designs, the method recommends itself as being fitted to promote the study of form." The two remaining frescoes, completing the series in the House of Lords, were finished in the autumn of 1849, and "the execution of these frescoes," again write the Commissioners, "appears to us to be highly satisfactory, and to indicate increased skill on the part of the artists in the management of the material." In adducing these data I wish specially to note, first, that fresco-painting has been proved, to the actual experience of the Commissioners, suited to mural decoration; second, that the technical difficulties of the process had been so readily overcome, that even the first trial was to all outward appearance a success; and, third, that our English artists have shown themselves fairly competent to meet the conditions which the new method imposed.

The series of eight frescoes illustrative of the British poets, executed on the walls of the Upper Waiting Hall, must next obtain our consideration. It appears that the Commissioners, in 1845, were desirous of affording opportunities for the execution of cartoon designs, and for the further practice of fresco-painting, and that therefore they set apart this waiting hall for the display of tentative works. The painters selected for these labours were Mr. Cope, Mr. Watts, Mr. Herbert, Mr. Horsley, Mr. Tenniel, and Mr. Armitage, artists who had already distinguished themselves either in cartoon drawing or in fresco painting, at some one or more of the competitive exhibitions.

After the lapse of five years, when four of the eight illustrations of the British poets were complete, the Commissioners were able to pronounce that, "in all these works, evincing various powers in the artists, we recognise a satisfactory acquaintance with the method of fresco, and in some, abilities of the highest order." In 1854, "these experimental works" are reported as finished, and that apparently to the entire satisfaction of the Commission. I shall shortly return to these frescoes when I come to describe and to discuss the causes of their decay.

The only remaining series which it is needful to include in the present survey, are the historic pictures executed by Mr. E. M. Ward and Mr. Cope in the Commons' and the Peers' corridors. The Commissioners, in their thirteenth and concluding report, published last year, state that "Charles West Cope, R.A., who has undertaken the Peers' corridor, has prosecuted his work with equal ability and industry. Five out of the eight paintings of which the series is to consist have been already finished, and the designs for the remaining three have been approved by us. The Commons' corridor," continue the Commissioners, "consisting of the same number of compartments, has been allotted to Edward Matthew Ward, R.A., whose name is so highly distinguished by his able treatment of subjects from Modern History." It is well that we should, just in passing, note that in the pictures last put up in these corridors, the method of fresco has been abandoned for the new German process termed water-glass. Of the merits of this invention we have not time, at present, to speak. Suffice it to say, that the Commissioners, in this their preference for the new discovery, passed a tacit, though, perhaps, unintentional, censure upon the time-honoured process of fresco. From any stigma which may in consequence attach, it is our object now to exculpate this pure and noble art. Other methods may possibly be good. The more indeed that means can be multiplied whereby national and municipal buildings may be fittingly adorned, the better. I do not wish to utter one word to the prejudice of water-glass, in which, indeed, both at Berlin and at Westminster, the grandest works have been executed. Only let this be clearly understood that the merits of other methods, whatever be their name, can in no way invalidate the approved virtues of the ancient and well-tried Italian art. These virtues have been lauded throughout the entire earth. These excellencies have been extolled, as you have heard in the extracts read, by the Commissioners themselves. The reports of these Commissioners indeed are occupied, as you will have marked, with laborious eulogies on this middle-age process restored for modern use. Every fresco was, as we have learnt, when finished, made the theme for express jubilee. And, therefore, to the cloud of witnesses which for centuries have paid tribute to the fresco art, must we add, last, though far from least, the Royal Commissioners of England.

We must now enter on the most difficult, not to say distressing portion of our subject, the decay of works which had entered upon a life so bright in promise. It is best. in the first place, that facts should simply be stated, without any conjecture as to causes.

We have spoken of three separate series of pictures, each to be found in a distinct locality. One group is in the House of Lords; a gallery of historic works runs along the corridors; thirdly, illustrations of the poets occupy the Upper Waiting Hall. These last have suffered most severely, and will therefore best serve as examples for the general description which I at once proceed to give. A close and detailed examination of these works will reveal distinct stages and probably different processes of decay. An early and premonitory symptom of disease would seem to be a blooming or frosting of the colours, which thus become as if mildewed. This affection extends, and hence the pigments undergo further change, and begin to fall from the surface of the plaster. Sometimes the process of disintegration would seem to have an external origin, possibly arising from the atmosphere. In other instances the agencies of destruction appear to be internal, dependent probably on the constitution and constituents of the mortar. Certain portions of the fresco are upheaved by some inner rebellious force, as if antipathies had sprung up between lime and sand and pigments. In this disruption, as in in the other phenomena of decay, several stages may be marked. The incipient traits of the distemper come in mitigated form. At first the fresco may give signs of dissolution simply by the colours having lost their fixity to the wall. The reds, the yellows, and the blues will come off when rubbed with the corner of a white pocket-handkerchief; spots or pimples may here and there be seen on the surface; these become aggravated into blotches, extending into confluent sores, so that the very tissues of the picture are eating and rotting away. Then it is that large blisters heave bloatingly on the arms, neck, and face of the figures, till at length the pictured forms peal off bodily, and fall as dust and ashes to the ground. Yet this destruction, though terrible just where it sets in, is far from universal. And this its essentially partial character we must in the present inquiry never for one moment forget. Partial effects point to like limitations in their causes; and causes which can be staid in their operation admit of counteraction. Most worthy, indeed, is it of remark that of two adjoining pictures, one shall have suffered ravages, while its neighbour shall be saved all but harmless. Furthermore, in the same fresco some colours have stood, while others have fled. In one picture, for instance, a blue dress remains firm, while a patch of brown close by has been dissipated. In another case, the light green sleeve of a woman's dress is peeling off to the thickness of cambric, while the body of the same dress, being painted with modified materials, lies hard to the wall. It is, then, I repeat, of great importance that we should mark that the decay is, after all, but partial in its extent. Yet, after making this fair concession, I am bound to say that of all the sad cases in which premature death has overtaken youth and beauty this is one of the most melancholy. In Italy I have known frescoes which have suffered cruelly from wind, rain, cold, and burning heat, or the reckless violence of man. Still they struggled on, and have survived for centuries. But these hapless offspring, cradled in an upper waiting-room, have barely entered on their teens; two decades are not complete since they saw the light. Surely we may well pause to ask by what fault this judgment has fallen on our labours.

The calamity which has overtaken the other frescoes in the Houses of Parliament is comparatively so inconsiderable that specific details are scarcely called for. In the House of Lords I noticed that some of the colours were loose on the wall, and in a few places there were indications of what may be termed mildew, with incidental eruptions and excoriations. All this, however, even in the aggregate, amounts to little. The injury to the frescoes in the corridors is still less. Indeed the only suspicious sign I detected in these works was the lax tenure of the body colours to the stucco; pigments which, probably having been added in distemper, are reduced to partial dissolution by the moisture of the atmosphere. Still I incline to think that in this or any other inquiry which may be instituted, it is more just—that is, more consonant with the actual facts—to throw all the frescoes in the Houses of Parliament in the same category. Some may have suffered heavily, others more lightly, even as, when an epidemic rages, certain patients die while others survive. Nevertheless I believe it will be found that the same seeds of decay are lurking in all the works, alike in their germs though greatly differing in their extent and virulence. The same lime, the same sand, and probably in great measure the same colours have been employed. The same atmosphere, charged with the products of combustion or with the refuse of human respiration, comes in contact with all the frescoes more or less alike; therefore I say, that the decay of these works is not so much a matter of the differing practice of individual artists, as it is the result of certain paramount conditions over which each painter had little or no control; and upon this I insist, in order to free the inquiry from all personal and invidious relations, and to reduce it directly to the strict limits of scientific investigation.

As to the precise causes of decay, little, unfortunately, is known. A Committee was appointed early in 1862, under the presidency of the First Commissioner of Works, to inquire into the condition of some of the frescoes. This Committee consisted of Sir Coutts Lindsay, Mr. Gambier Parry, the late Mr. Le Strange, Mr. Ruskin, and Dr. Hofmann. The paintings, not only in the Upper Waiting Hall, but throughout the building, were carefully and repeatedly inspected, and various artists and other competent witnesses examined. Yet, we are told, that the Committee "have not been able to arrive at any satisfactory result." Rough notes were taken of the proceedings, but no report has been issued, and the Committee is now defunct, leaving as the only record of its labours a well-considered letter from its chemist, Dr. Hofmann. "The general theory," says Dr. Hofmann, "of the fixation of the fresco assumes that the surface of the finished picture becomes coated with a pellicle of carbonate of lime, which protects the painting like a varnish. Carbonate of lime being practically insoluble in water, but soluble in water containing free carbonic acid," the question was naturally suggested whether the carbonic acid and water generated by the combustion of coal gas and by respiration might not have occasioned the deterioration of the paintings at Westminster. Accordingly, by way of experiment, a stream of water saturated with carbonic acid was allowed to run across the face of a fresco. We are told that after twenty-four hours the effect became very visible; that the colours grew paler and paler, and that, after the lapse of some days, the pigments were actually colourless. Dr. Hofmann proceeds to remark that, though he was not in a position to offer a definite opinion regarding the true cause of deterioration in the frescoes generally, he has yet been led to the belief "that the injuries are partly attributable to the fact of the surface of the wall having, in too many cases, been too long exposed to the action of the air, and thus become carbonated before the paint was put on. To use an intelligible, although not absolutely correct, mode of expressing it, the picture was put *upon* instead of *under* the protecting pellicle." This valuable letter, then, from Dr. Hofmann, which I shall proceed shortly to examine, is, I repeat, the only known result of the committee's labours.

This committee no longer exists; the Royal Commission itself is dissolved; the frescoes are allowed to proceed steadily in course of decay, and the only remedy taken is the abandonment of the process. This, the present state of the case, I deem, as I have already said, most diastrous. Discouragement has thus laid hold of professional men and the general public; and the progress of the arts I fear has thereby suffered material check. On the purely chemical causes of the decay, which we all deplore, I shall say nothing, partly because I am wanting in the needful knowledge, and also because the investigation which alone could give value to a judgment stretches far beyond the limits of private and individual labour. The subject is of public importance and moment, and ought to be undertaken on public grounds and at the general expense. I shall not attempt, then, to exhaust this question, which is indeed inexhaustible. One thing only I will do, which at this moment ought to be done promptly and positively: I will endeavour to prove to you that the reverse which has been sustained at Westminster should in no way militate against the further adoption of the fresco process, either in the metropolis or the country at large.

In the first place, it may be well that we should mitigate our surprise that these frescoes have decayed at all. It has been too much the fashion to hold the art as indestructible, as if indeed any art could be imperishable. Pictures of all kinds are endowed with constitutions proverbially sensitive, and the utmost that can be hoped for is that a stamina may be gained sufficiently robust to hold up in some degree against the ravages of time. But absolute immunity from decay is obviously unattainable. The mural paintings in Egypt, at Pompeii, and in the Baths of Titus, in Rome, have suffered injury; the mosaics in front of the Cathedral at Orvietto, and in the façade of St. Mark, in Venice, have fallen away and been restored; the panels and the canvas of oil pictures rot, and so in like manner it has been always known that the frescoes executed in the middle ages were amenable to specific agencies of destruction. Mrs. Merrifield, in her carefully-compiled volume, published eighteen years ago, has on this very point the following suggestive passage:—" The causes to which writers on painting commonly attribute the destruction of frescoes are damp, and the presence of salts in the substance of the wall, or the plastering or intonaco, or saline particles deposited on the paintings by the sirocco and other winds which blow over the sea; the injuries arising to the paintings from injurious attempts to repair them, entire neglect, or wilful injuries. Instances of the injuries to frescoes arising from damp are so numerous, that it is useless to enumerate them." Accordingly every traveller in Italy has to mourn over the decay or absolute destruction of multitudes of these works. That in England they should prove exempt can surely then be neither matter of surprise nor cause for discouragement. Historic evidence only justifies this expectation, that fresco-paintings, when executed with due circumspection, and when saved from unfair aggression, will endure as long as most other human creations. This assurance, which no existing facts materially contravene, is sufficient for all practical purposes.

That English artists and English patrons need feel but little discouragement from the failing of materials or the fault of climate, it is easy to show. We have already said that the fewer, the simpler, and the more natural the colours used, the better. The painters of the middle ages knew no royal road where pigments might be picked up ready for their use. The practice of these men was the growth of patient experience, their ultimate success was purchased at the cost of repeated failure. The materials they used are known to us, and lie within our reach, and modern science, to boot, brings to our aid far-searching eyes and wide-spreading hands. Any artist, then, who shall be heard to utter complaints against his materials may be at once put down with the workman who quarrels with his tools.

As to faults in the English climate, or the vicious elements in our town atmospheres, there has been more talk than the facts of the case warrant. I have suffered from cold and damp in the chapel of Giotto, in Padua, to an extent that could not possibly be experienced in the halls and corridors of Westminster. I have seen in Pisa, frescoes streaming with rain and condensed moisture; and yet some of the pictures executed by Benozzo Gozzoli, about the year 1450, are as fresh as if painted yesterday. In Munich, the centre of the German revival, the snow lies for three months of the year, and the streets are traversed by sledges. Furthermore, we should bear in mind that in Northern Italy and Southern Germany it has been deemed no madness to brave the bold experiment of fresco painting in the open air. In England we have ventured on no such rash attempt. All the mural paintings hitherto executed in London or the provinces have been safely housed. Our much-abused English climate, therefore, which is usually made responsible for the sins of its inhabitants, offers no absolute impediment to the practice of the fresco art.

In like manner the injurious effects ascribed to the noxious elements with which our city atmospheres are loaded have been greatly overrated. At all events, it may safely be asserted that the destruction of the frescoes in the Houses of Parliament is to no appreciable extent to be ascribed to such agencies. Dr. Hofmann, in the letter already quoted, proves by experiment that a picture may be bleached by pouring a "stream of water saturated with carbonic acid" across its surface. But most properly he appends the remark that "it can scarcely be admitted that the frescoes in the corridors of the House are exposed to anything like this severe test." And it is also most material to add that the actual injuries sustained have nothing whatever in common with the bleaching effects produced by Dr. Hofmann in the interesting experiment. That mural pictures, especially when painted in secco, or, to employ the graphic metaphor of the writer of the letter, when "put *upon* instead of *under* the protecting pellicle of carbonate of lime," are, to a certain limited extent, prejudiced by the obnoxious products of combustion and human respiration, cannot wholly be questioned. Yet the inquiries which have been from time to time instituted as to the injuries sustained by the pictures in the National Gallery and at South Kensington, show that the fears arising from these causes have been excessive. Sixteen colour tests, consisting of surfaces covered with white lead and fugitive vegetable or mineral colours, were hung up for the space of two years in various public institutions in the metropolis. It is satisfactory to know that these tests gave no indication of the action of gas, and the only chemical change that could be distinguished was to be ascribed chiefly to the want of ventilation. It is now generally admitted that the pictures in the National Gallery are exposed to no specific danger. Probably, indeed, these works have, in the earlier years of their existence, suffered more severely from the fumes of incense, the smoke of candles, and the close and affectionate approach of devotees, than from the not very insalubrious breezes of the river Thames.

The best, because the most practical answer, however, which can be given to these objections touching climate and populous towns, is in the simple fact that certain frescoes painted in the metropolis are still in a good state of preservation. I have, for example, carefully examined, with a powerful opera glass, Mr. Watts's fresco in the dining-hall of Lincoln's Inn, and find, with the exception of one or two square inches, that its vast extent of surface is still intact. Mr. Watts has shown me frescoes executed by him in Little Holland House; I have also seen rooms of a mansion in Carlton-terrace decorated by the same artist; and the colours in all these examples are just as fast as when first painted. Again, Mr. Armitage some years since painted a fresco in a chapel at Islington, and that, too, lies firm on the wall, and the colours are unchanged. Such instances are sufficient evidence of the practical knowledge of our English artists, of the soundness of materials at command, and of the benign temper of our English climate.

The interest of high art demands that some recognised authority should put an end to the present state of uncertainty, so perplexing to painters and bewildering to the public at large. The manipulation of fresco is simple, and the conditions for ensuring its permanence cannot surely be difficult to discover. And yet, in the absence of any constituted tribunal entitled to pass a judgment, the entire question of mural decoration is left in doubt and confusion. The Royal Academy has never in these matters taken that lead which might have been reasonably expected. The Royal Commission, as we have seen, is dissolved; and yet there never was a time when knowledge and guidance were more needed. It strikes me forcibly that in this state of interregnum the Society of Arts could, with advantage, come to the rescue. A preliminary inquiry, entrusted to a joint committee of men of proved knowledge in science and art, might be instituted; a report, decisive in its facts and definite in its conclusions, should then, after due deliberation, be issued. But, in default of any such further and final investigation, advantage might be taken of the accumulated material locked up in Parliamentary Blue Books, and lying dormant in the scattered art-literature of the last twenty years. A "Handbook to Mural Decoration" could thus easily be compiled, which should give to the artist all needful information touching lime, sand, and the preparation of the mortar, together with well-authenticated facts relating to pigments, vehicles, and modes of execution. Such a guide would do much to prevent the recurrence of the blunders incident to inexperience.

Many of the practical and merely technical impediments being thus removed, the essential and artistic qualities of fresco would scarcely fail to win for it a way to extended adoption. England has happily within the last few years passed from the era of whitewash to an epoch of colour. In architectural form and composition the advance made during the same period is almost without precedent. The vast multitude, too, of buildings which have arisen in the land, churches, chapels, schools, clubs, railway stations, almost surpass calculation or belief. Who then shall venture to estimate the superficial area of wall space which is now ready to receive fresco decoration. One error, however, committed by our English artists has, it may be feared, materially impeded the general reception of these mural embellishments.

"I think," said Sir Coutts Lindsay, in his evidence before the recent Royal Academy Commission, "our artists in England have misunderstood the proper object of fresco painting. With a few exceptions, the frescoes that our artists have painted have been much too finished in detail, and much too little considered in the masses. They have painted them in the spirit in which they would paint easel pictures, the consequence is that they have cost them infinitely more time than they could afford to expend. Fresco painting has been a losing concern to every artist who has attempted it." Mr. Armitage has favoured me with a valuable letter to the same effect. Fresco ought not, writes Mr. Armitage, to be an imitation of oil painting. No rivalry should exist between the two branches; their objects are distinct, and so equally ought to be their modes of treatment. It is most important that the public should clearly understand that fresco, when executed broadly and simply, is an economic mode of decoration. A group of half a dozen figures, highly elaborated, after the manner of oil, might occupy a year and cost £1,000; the same group, pitched in a monochromatic key and painted broadly in fresco, could be executed in three months, at a quarter of the cost. "It is," says Mr. Armitage, "astonishing how effective a mere outline design filled in with flat tints and with the shades merely indicated, may be made, provided such outline be of a grand and impressive form." Mr. Armitage concludes his letter in these definite terms—"It would, therefore, be necessary before fresco could become general in the country, first, that the subjects selected for the decoration of buildings should be of a simple nature; secondly, that the execution should be broad and rapid; and thirdly, that the artist should be willing to sacrifice a portion of his accustomed remuneration in the service of a noble art, and for the honour of his country."

That the art of fresco is peculiarly noble, monumental, and architectonic, all authorities are agreed; that in its severe and stately forms it is peculiarly calculated to bring to our English school the discipline so much needed, all persons conversant with high and historic styles readily admit. The very difficulties of fresco, says Mr. Watts, are, in the present state of our English school, advantages. The necessity of a definite plan, of a fixed and firm outline; the need of architectural treatment, with its inherent symmetry and severity, all these are not disabilities but elements of power. Again, the demand for rapid execution renders simplicity imperative, and in simplicity is grandeur. These things considered, it is not surprising that many witnesses examined before the late Royal Academy Commission—Mr. Layard, Sir Coutts Lindsay, Mr. Watts, and others—look forward with confidence to the time when the historic deeds which have conferred honour on England shall shine forth upon the walls of our national buildings and municipal institutions; when the beauteous thoughts of our poets shall adorn our literary clubs; when the classic designs of Flaxman shall ennoble our public schools; and when the English mind, which has spoken through Shakespeare and Milton, and which responds to the choruses of Handel, shall obtain, through the noble art of fresco, worthy pictorial manifestation. In fine, that art which was so living and so abiding a reality for Italy, cannot remain, as at present, in practical England a mere illusive dream. The transient dishonour which we have suffered in the too speedy decay of the paintings at Westminster must be retrieved; and works, I trust, may shortly be executed in this country which will prove, like the grand frescoes of the middle ages, noble and enduring.

DISCUSSION.

Mr. **Bishop** remarked that on examining some paintings in Pompeii he had noticed an appearance which led him to the impression that the colours had been varnished over with wax, which was apparently absorbed into the mortar. With regard to modern frescoes, he thought it was very important that the mortar should be made of suitable materials. In one instance in Italy he observed the operator making mortar of Carrara marble; and at Naples, on one occasion, he saw them making lime from oyster shells.

Mr. C. H. **Smith** observed that, with respect to mortar, whether it was made of oyster shells, Carrara marble, or chalk, it mattered not. In each case lime was produced, with only a trifling addition of foreign matters.

Mr. R. N. **Wornum** wished to offer a remark or two upon the statement of Mr. Atkinson with reference to the alleged durability of fresco painting, as illustrated by the continental specimens to which he had referred. He believed that many of those pictures were not in reality pure frescoes, for true fresco painting was of a comparatively modern date, and many of the old oil paintings were of a date anterior to the frescoes. The Egyptians never painted in fresco; their pictures were all in tempera. The Romans and Greeks likewise never painted in fresco, though they used it for colouring their walls. All those nations painted their pictures in tempera. The plaster was very solid and hard, and the pigments were worked up with various materials, such as eggs, gum, and glue. The Egyptians used hippopotamus glue, and the Romans varnished their pictures with wax, which was burnt into the wall, and produced great durability. In the tempera pictures which had failed, the fresco colouring of the walls, which was the foundation of the picture, had not given way, but the pictures had fallen off, because they were not so thoroughly attached to the wall as the original fresco colouring was. With regard to the Italian frescoes, he believed there were but few specimens of the pure fresco extant; they were for the most part secco and tempera, and he beieved it was only at Pisa that genuine old frescoes could be met with, the earliest of which were the production ot Pietro d'Orvietto, dating at the close of the 14th century. Mr. Atkinson had dwelt upon the greater durability of fresco as compared with oil painting. That was not proved as yet, and certainly was not corroborated by the specimens of the art that were to be met with in many parts of Germany, particularly in Munich, where he (Mr. Wornum) resided 30 years ago, just about the period of the revival of fresco-painting; and on revisiting lately some of the most magnificent works executed at that time, he found that large patches had become destroyed. If it answered better in Italy he could only attribute it to the dryness of the climate, that of Germany having proved, in his opinion, unsuitable for this process of painting. There were in our National Gallery oil paintings of earlier date than most existing frescoes, many of them being still in a perfect state. With regard to the climate of this country there was not only the severity of the weather, but, particularly in London and larger cities, there were the smoke and dirt to contend against. In this country the surface of a picture must either be smooth, so as to allow of wiping, or else it must be protected by glass. It would not do to have a rough surface, because of the amount of dirt and soot that got into the crevices. It was far easier to keep an oil painting clean in this country than a fresco, inasmuch as the latter held more dirt, from its being of an uneven surface. The amount of dirt which accumulated from the atmosphere of the metropolis was something astonishing, and the pictures in the National Gallery, which were not protected by glass, required frequent wiping. For the reasons he had given, he thought fresco painting was not a system of mural decoration suitable for this country.

Mr. Armitage remarked that he knew of no better means of cleaning fresco pictures than rubbing them with stale bread, which removed the dirt most effectually. His fresco pictures in the Roman Catholic church at Islington, had not suffered in any way. He should like to hear any opinions with respect to the kind of sand to be employed. The so-called silver sand was used in the Palace of Westminster, and whilst he was at work upon one of the frescoes there, a German artist who was present objected to the use of this substance, and recommended that powdered granite should be used, as the only material that would render frescoes durable. If, however, the Munich frescoes had all failed, it did not argue much in favour of the superiority of granite sand. He had not gathered from Mr. Atkinson what he considered to be the chief cause of the decay of fresco pictures. The deterioration in the frescoes of the Houses of Parliament was very deplorable, but at the same time there were other frescoes in London where that decay had not taken place. No one, however, had yet explained why this had occurred in one place and not in another.

Mr. J. M. Blashfield said that during the early operations at the Houses of Parliament, some inquiries were instituted with respect to the lime to be used for the frescoes. He received specimens of some of the various kinds of lime, and he found one or two contained traces of peroxyde of iron; moreover, upon an examination of the existing frescoes at Westminster, he had come to the conclusion that the lime used in them must have contained a small quantity of iron. He knew also that silver sand contained a considerable quantity of iron, as he had used it very largely, and in some cases the quantity was so large that if the sand was placed over a fire it turned a pink colour. There were other qualities of sand which, before washing, looked dull and brown, but when washed and dried were very pure, and from such glass of excellent quality could be made. It was that sort of sand which he thought should be used for frescoes. The calcination of lime was a matter to which he thought too little attention had generally been given, and the sources from which the lime was derived also produced variations of quality. Some chalks contained from one to two per cent. of peroxyde of iron, whilst in others the proportion was very small. All chalks which contained iron formed lime more or less hydraulic; lime which was entirely free from iron had no hydraulic character, and would never set under water. It was, therefore, an important matter to those engaged in fresco-painting, that they should thoroughly understand the qualities of the lime they employed so as to produce the most durable work. The lime obtained from marble was somewhat porous when set. On examining a piece of mosaic from Pompeii, he was struck with the similarity between the fine mortar in which the small pieces of mosaic were imbedded and the ground of the frescoes there discovered. Both were porous, but very white and hard. It appeared to him that something like pumice or lava, partaking of the properties of the pozzolana of Italy, had been mixed with the materials, which had given a certain amount of porosity while it aided in the hardening of the lime, and formed the groundwork of the fresco, making it more ready to imbibe the colours. He had calcined Italian marble, and slacked it with great care; but it did not make a hard mortar. In his opinion, in most cases lime was not slacked properly for architectural purposes. When it was properly slacked and well kept, after four or five years it became so hard that it required great labour to bring it again into powder; but when carefully treated and laid on well with a proper quantity of sand, it would gradually dry without cracks, while new lime was sure to crack and blister. It was also most important that the bricks forming the wall should be well burnt, otherwise the salts left in them would be sure to find their way to the surface, and ultimately destroy the plaster. An instance had come under his own knowledge in which 20,000 bricks were burnt with only four tons of coals; whilst, in another case, no less than sixteen tons were consumed in burning 4,000 bricks. If the bricks were properly burnt, and if fine sand properly washed were used in the mortar, he had no doubt fresco pictures would possess the same durability in this country as that claimed for them in Italy.

Professor Kerr would venture to submit one other theory with regard to sand, which he believed was supported by the experience of very remote antiquity, viz., that the sand used should be stone-dust. Vitruvius, in describing the materials used in fresco, stated that the sand used was made by pounding stone rubbish. The effect of that might not be apparent at first sight, but on consideration it would be found to be an important point. The use of sand in plaster was this—it supplied the strength of the substance, the lime acting as the cementing medium, connecting the grains of sand together. But the lime which connected the grains of sand together was of itself a weak material, and liable to decay. It was simply carbonate of lime, divested of its carbonic acid by burning. Pure lime contained no carbonic acid, but if they mixed mortar with stone-dust, as was customary with masons for some descriptions of work—stone-dust instead of sand—the result was that the lime absorbed the carbonic acid in the stone-dust, when it became restored to its natural condition of carbonate of lime, and the process of hardening went on more rapidly. He thought these considerations were of importance as bearing upon the preparation of the ground-work for frescoes with a view to durability.

Mr. J. G. Crace said, although he was a great lover of fresco painting, yet, from all he had observed, he thought he must come to the conclusion that it would be a waste of valuable artistic time to continue to carry on the practice of that art in this country. In recent visits to Italy he had paid very particular attention to this subject, and had noticed that in many of the frescoes which were executed by early Italian masters some 400 years ago, the colours seemed to be perfectly fresh and the ground well preserved, but directly he quitted Italy and came into more uncongenial climates, he found that all works of this character that had been carried out for some great length of time, were more or less injured, and he thought it was only under the influence of the peculiarly genial climate of Italy that fresco-painting could be carried on with safety. Of the paintings on walls exposed to the effects of the weather perhaps the most remarkable were those of the Palazzo Doria, at Genoa, executed nearly 400 years ago. The figures appeared perfectly fresh and beautiful, and in no way seemed to have lost the richness of the colouring, nor did the lime surface itself seem to have been acted upon. In those at Florence, which had been preserved by having been placed in the interior of the buildings, the colours seemed to be quite pure, fresh, and bright. He knew of no more beautiful example than that of Fra Angelico, which was but imperfectly represented in one of the chromo-lithographs exhibited this evening. It was most beautiful in colour and simple in design and execution. He did not, however, know, through the whole of the north of Germany, in Switzerland, or in Belgium, a single example of a well-preserved fresco existing. Of late years, he believed, that style of decoration had not been attempted. In Cologne Cathedral the results of its use were most melancholy. He would now say a word as to the various influences that were likely to injuriously affect any frescoes that might be executed in this country. First of all he would ask them to consider the external effects of our climate upon stone buildings. Look at St. Paul's or any other great building which had existed for any length of time in London, and see what were the effects of the climate upon them. If this were so on a plain, undecorated surface, how entirely would any painting with a variety of colours be destroyed. Then, again, there were influences operating behind the picture as well as on the front. If the lime were not well mixed, it would throw out an efflorescence which would cover the picture with a sort of mildew similar to the effects that were to be witnessed in the Houses of Parliament; and if the sand was not of the right description, the work was sure to be injuriously acted upon. The question then arose, why should we be bound to adopt fresco? He thought the step now taken by the artists employed upon the houses of Parliament was the right one, viz., the covering their pictures with a substance which produced a sort of vitreous surface not likely to be acted upon by our climate. The water-glass process no doubt possessed many valuable qualities, but the difficulty was to find a surface which the salt employed would combine with properly. He believed the only surface yet known which united intimately with water-glass, was simple whitening; a lump of whitening, which would crumble in the fingers, if dipped into a solution of silicate of potash became as hard as stone. As regarded encaustic painting, he thought the alternations of heat and cold of our climate would have a very prejudicial effect upon pictures executed in that style; and there was the further objection—that they could not cleanse wax paintings. Therefore, acknowledging as he did to the fullest extent, the beauty of the effects of mural painting, he felt that the great object to be attained was, to discover such a protective surface as would obviate the destructive influences which he thought at present precluded the employment of fresco in the arts of this country.

Mr. C. H. Smith expressed his regret at what must be regarded as the unsuccessful results which had attended the fresco decorations at Westminster. With but few exceptions the same fate had attended the works of this character abroad. The picture of the "Last Supper," by Leonardo da Vinci, was almost entirely gone [Mr. Purdie said that was an oil painting], and the same might be said of Raphael's beautiful ornamentations of the Vatican. The great objection to fresco, he thought, was its uncertainty—a small experiment might succeed whilst a large one might fail. Then there was the further objection—that real frescoes must always be copies from an original design. The artist could only prepare his materials for just as much work as he could accomplish in a day. Then, again, a pure fresco could not be re-touched, and he would ask, was it possible for any artist to paint a large picture satisfactorily piece by piece? It would scarcely happen but that he would desire to retouch certain parts and tone other parts differently; and besides, the effect of the colours when dry, was very different from that produced when they were first laid on. He did not agree with Mr. Atkinson in the opinion that valuable works of art should be attached to a building so as to be irremovable. We were fortunate in having in this country many pictures in oil of great value, which we could not have had if they had formed parts of mural decoration. He entirely concurred with the views expressed by Mr. Blashfield as to the effects produced by salts and alkalies in imperfectly burnt bricks, and also in many descriptions of building stone. When bricks of that description were used in the interior of buildings the effects were apparent upon the plaster, and the salts left in the imperfectly burnt bricks would penetrate through walls of great thickness. He thought this was the cause of the destruction of fresco more than anything else. The water glass process, he thought, had not as yet been sufficiently tried to warrant its general adoption.

Mr. Purdie, as one who had made a considerable number of experiments with the various systems of fresco as well as with water-glass, begged to offer one or two remarks. Works of art like that referred to by Mr. Smith—the "Last Supper" of Leonardo da Vinci (which was an oil picture), painted upon walls, were subjected to two deteriorating influences, first, there was the condensation of vapours upon their surface, and secondly, there was the damp from the wall behind them; and the more impervious the surface of a picture was, the more liable it was to be affected by the damp from behind. The consequence was that in the instance alluded to, the damp from behind had carried away the surface of the picture. With regard to the various methods of fresco painting, Mr. Atkinson had described them as *buono* and *secco*, though the name of the latter was contradictory to fresco; then there was a third process, which might be termed the Pompeian fresco. It had been contended by one speaker that the Pompeian paintings were not frescoes; but from experiments he had recently had to make, he (Mr. Purdie) believed a great many of them were frescoes. The surface on which the pictures were painted was polished, but the picture itself was not so. It was supposed by some that the painting had been executed in wax, whilst others supposed it to be tempera. He forwarded a piece of the composition to the Museum of Geology, in Jermyn-street, and the result of analysis was that no trace of wax or other binding substance was found it it; there was nothing whatever but the pigment and carbonate of lime. The conclusion arrived at was that the picture was executed before the lime was dry. With respect to the issue raised by the paper, whether or not it was desirable to pursue the art of fresco painting further in this country, he would not, at that late hour, enter into that topic; but he would remark that whatever merit was claimed for frescoes was possessed in an equal, and even greater degree, by the water-glass process. That system had now been substituted for fresco by all the artists engaged in the Houses of Parliament with, he believed, the single exception of Mr. Dyce. The difficulties under which fresco decoration was carried out had been very aptly described by the last speaker, especially with regard to the difficulties of painting a picture in small portions from day to day. It was, indeed, very rarely that any artist could execute a satisfactory work under such circumstances. With regard to the fresco works of the old masters, he believed they had all been afterwards touched up in tempera. Reverting to the subject of water-glass, Mr. Purdie remarked that it was free from many of the practical difficulties which were at present inseparable from the fresco process; the whole ground-work was plastered over and allowed to dry before the colour was put upon it. The painting was executed with pure distilled water, and it was then covered, by means of a syringe, with a solution of silicate of potash, which bound the colours to the surface. This appeared to him to be a remarkably simple process; and if the same effects could be produced as in frescoes, why should we continue to fight with difficulties, and why should we strive to attain by a mountainous path the point which might be gained by a level road? With regard to rendering frescoes permanent on exterior walls, he expressed his individual opinion that no attempt to effect this would be successful, and he confessed he viewed the external frescoes at Munich with anything but agreeable sensations. He hoped such effects would never be imitated in this country.

The CHAIRMAN said that before moving the vote of thanks to Mr. Atkinson, which he should do with the greatest pleasure, he wished to make a few observations. He was sure all present had derived the greatest satisfaction from the very able and lucid paper that gentleman had brought before them. When he was asked to take the chair on this occasion, he thought the best thing he could do was to endeavour to elicit the views of artists conversant with the subject, for what was really wanted was practical and technical knowledge on the process of fresco painting, and he believed he had gone to the very best sources for obtaining the most valuable information. He went in the first place to Mr. Watts, who sent him to Mr. Leighton, and subsequently to that he saw Mr. Herbert and Mr. Maclise; and he had before him letters from most of those gentlemen which would greatly interest those who had given attention to this subject. What they wanted to ascertain was, what was the proper material to be employed in this process and what was not. If he might venture to criticise anything which had fallen from Mr. Atkinson it would be this—that his paper showed a foregone conclusion in favour of fresco painting in its pure form, as practised by Giotto and the older Italian masters, and that the failures in this branch of art which had occurred in the Houses of Parliament ought not to induce us to abandon the exercise of the old process of fresco. Mr. Atkinson had pointed to the chromo-lithographic prints exhibited. These had been brought out by the Arundel Society, which had a good object in view, but if he had been in Mr. Atkinson's position—arguing in favour of frescoes—he would not have pointed to those prints, inasmuch as the object of the Arundel Society was to preserve to after ages some feeble record of those great masterpieces of early Italian art, the originals of which were mouldering and fading away. So far from appealing to these prints as evidence in favour of returning to a process which, Mr. Atkinson stated, had been abandoned by the artists employed by the Government, he (the chairman) would point to those chromo-lithographs as reasons for not rushing to the conclusion that we could not in the year 1864, find some better and more durable means of mural decoration. The tendency of the discussion was decidedly that fresco painting was unsuited for decoration in this country, but while they admitted that *fresco puro* was imperfect in itself, let them not on that account give up mural decoration altogether—he meant high art on their walls—till they were assured no good substitute had been discovered. He had before him a valuable little pamphlet by Mr. Gambier Perry, which showed that, while the most serious effects had been produced upon the frescoes at Mantua and other places where they existed in damp cloisters, yet in Egypt the colouring on the tombs of the Ptolemies was as fresh and bright as if only done yesterday. Whatever might be the merits of this process, however, it was clear from the experiments made in the Houses of Parliament that it was not suited to the climate of this country. But of this he was certain—they must not on that account be discouraged from attempting mural decorations in the highest style of art; and there were artists in England now who acknowledged that a fitting substitute had been found in the water-glass process, which was well suited to our climate. He had had a most interesting conversation with Mr. Herbert on this subject. That gentleman told him he had nearly been driven mad by the trouble and annoyance which the old system of fresco caused him. He added that he never knew how his work would turn out, the colours being put on while the plaster was wet, in which state it remained for about eight hours, and having finished a piece on one day he had to wait till the next to see whether it was correct. But, in addition to this, there was another element of difficulty, that if the plasterer put a little more water into the plaster one day than the day before, although Mr. Herbert might use the same colouring, when it was dry the effect would be quite different. Thus with respect to the small fresco of King Lear and Cordelia, which had stood the best (only one head having gone, owing to the uric acid from an adjoining room having trickled through and affected the colouring from the back) Mr. Herbert had cut out the head of Lear six times, and that of Cordelia five times, and there was no part of that picture which had not been cut out four times. From what he had said it was obvious that the plasterer must be as accurate in his work as the painter, and it sometimes happened that the painter and the plasterer were not on the best terms. It was a melancholy fact that Mr. Dyce's and Mr. Herbert's plasterers had each died mad—one raving mad and the other melancholy mad—and Mr. Herbert attributed this, in a great measure, to the effect of the constant worry those men were subjected to in their department of the process. He was gratified to find that Mr. Herbert expressed himself satisfied with the water-glass system. He had asked that gentleman to put upon paper his opinions generally on this subject, and he would now read the communication with which Mr. Herbert had favoured him:—

> "I am quite convinced that however true the theory of fresco may be, the practice of it always has been, and will ever prove, next to an impossibility, if indeed any refinements or subtleties of art are attempted. I may be asked, have not the Italian painters left evidences to the contrary of this assertion? I reply, using the words of Vasari, that in his time there was but one "true fresco in Italy," and the melancholy condition of frescoes throughout the continent shows further proof of Vasari's statement. Almost all the really great colourists of Italy abandoned it after a few trials, and the Michael Angelos held up to us as marvels of fresco have long since been in a hopeless state of decay. The smallest work in genuine fresco, carried to any point of excellence without employing the fugitive mode of completion, *i.e.*, vinegar and white of egg (so freely used by Italian painters), would be an achievement only to be attained by successive obliterations and waste of life. Fresco may do admirably well where a slight bravura sort of art is required, but this should be the passe-temps for those whose aim is very moderate and whose employers are easily satisfied. Fresco has had a fair trial here, and is to give way before something a thousand times better in every way."

Mr. Maclise had written to him as follows on the subject of the water-glass process:—

> "I beg leave to send you a proof of a report I made to the Royal Commissioners of Fine Arts, the late Prince having wished me to repair to Berlin to see the process and performance of the stereochromic method, as practiced by Kaulbach and others. You may not have leisure to look over the report, and therefore I must only ask you to receive the very latest intelligence on the subject of my daily practice. This practice with me is one of the utmost simplicity, I may say I have had a kind of pleasure in so simplifying it. On this fair tablet of forty-six feet of pure plaster, spread at once, I paint in colours ground with pure water, my only vehicle being distilled water, and this simple proceeding (being indeed the process of fresco secco) becomes nearly indelible by the mere fact of the colours being absorbed. This true water-colour painting (and what is called water-colour is in fact gum colour) becomes permanently fixed by shedding over it a spray of water glass through a syringe. The advantages of this method over that of fresco are obvious. The couch of plaster is spread at once over the whole surface, and not laid in piece by piece—each day's work to be painted on while fresh, to secure fixation. This old piece-meal process makes the work a kind of mosaic, and in a complicated design becomes a miracle of intricacy in

its joinings, and, although a misery to the painter, is a perfect triumph to the plasterer. In the new process we can proceed, if we like, with as much freedom as we approach a canvass, no cautious and cowardly preparation of sketches, and the cartoon to be punctured or styled on the wall and slavishly copied, whereby the vigour of the cartoon is lost, with nothing to compensate for it. As regards my own practice just now, I may reply to your inquiry, which is in itself a flattery, that although I have made a careful design of the subject to be painted in this place, yet I need not have done so, and as it is, I paint direct on the wall constantly from models of all sorts, sailors, marines, guns, tackle, ropes, blocks, and my hoarding is a kind of museum of marine stores, for which indeed I am originally indebted to your Lordship in having mediated for me, at my request, with the Secretary of the Admiralty, by whose favour I have secured attention at the War-office and stirred up all kinds of sympathies at Woolwich and Greenwich. To get Nelson's coat from its glass case in Greenwich Hall to my house at Chelsea, where I could do justice to the details of its buttons, required, I do believe, the intervention of the whole Board of Admiralty with the Governor. Dr. Hofmann said that the water glass spread over the picture ought to effloresce as a proof of its efficacy. I should prefer this not to take place; perhaps your Lordship may be able to learn something about it."

They had thus high testimonials in favour of the water-glass system, which it appeared had stood the test of a good many years. The examples of this process at Munich had stood while the frescoes had faded. The chairman then went on to state that he had received no written communication from Mr. Watts, than whom, however, no man had more enlarged views of art, or more devotion to fresco-painting. In proof of that, he might mention that Mr. Watts, during the time General Anson was Chairman of the London and North-Western Railway Company, offered to decorate in fresco the large hall at Euston Station, the company only bearing the expense of colours and the necessary scaffolding. That offer was not taken advantage of; but the liberal spirit of Mr. Watts met with a more ready response in the case of the hall of Lincoln's Inn, and when the work was done the Benchers were so struck with the handsome conduct of Mr. Watts that they voted him a sum of £500. No man had done more for fresco painting than Mr. Watts, and that gentleman had sent him to Mr. Leighton, for information with regard to the new process of mural decoration discovered by Mr. Gambier Parry, who, however, was not himself a painter, but had employed Mr. Leighton to execute the decorations of a church at Lyndhurst, in Hampshire. Mr. Parry had published a communication in the *Ecclesiologist*, and the extract he would read from it he believed would be interesting to the meeting—

"To meet all the requirements of wall-painting (where the walls are dry) with little risk of injury from the action of our climate, avoiding the objections to other systems, and retaining all that is good and effective in them, I recommend the following scheme. Take a medium composed in these proportions—

Pure bleached wax	3	ounces	by weight.
Elemi resin	1	„	
Oil of spike lavender . . .	6	„	liquid measure.
Finest preparation of artist's copal .	18	„	

which shall be used throughout from the first preparation of the wall to the last touch of colour laid upon it, that the whole mass may be perfectly homogeneous. All colours are to be ground up in it, and may be kept in tubes, as oil colours are, or in any other way. The same composition diluted in *twice its bulk* of rectified spirits of turpentine makes the liquid with which the pores of the wall are to be saturated by copious washes. The number of these washes must depend on the absorbency of the wall surface; and the more absorbent that be the better. The last wash should be mixed up with—

Best gilder's whiting well washed and baked dry.	3 parts *in bulk*, not in weight.
Fluke white ground (as usual) in water and perfectly dry. .	1 part, ditto.

to the consistency of thin cream; the surface should be well covered with it; indeed, in most cases, two coats of this are better than one. Common rough wall plaster will take two doses of the transparent wash, and two with the opaque white. Each wash should be allowed twenty-fours to evaporate. The object of these washes is to key the prepared surface deeply into the pores of the wall with a material which dries in them as hard as stone, and leaves a surface white, solid, absorbent, and of a good texture for painting. When the cartoon is traced on the wall, let a part of a design be chosen enough for a day's work, and washed over thinly with oil of spike or highly rectified turpentine, (the former is better, being a stronger solvent of the copal) the object being to open the surface which will then be painted into, and dry in one solid mass by the evaporation of the volatile oils. The wash should be lightly applied, before the palette and colours are prepared for the day's work; the time thus employed will allow the surface to dry just sufficiently to let the paint be applied without dragging up and mixing with it.

"The vehicle for painting in which the brush should be dipped must be either the same as the wall wash, only twice as much diluted, or oil of spike alone; or, when the cost of the spike oil is an objection, highly rectified turpentine. The surface dries gradually, not skinning over, as oil colours do, but equably throughout by evaporation."

On this subject Mr. Leighton had written to him as follows:—

"As I am, to the best of my belief, the only professional painter who has worked with Gambier Parry's spirit fresco, it may be convenient to you to refer to my unfinished works at Lyndhurst. I therefore send you two or three details which may interest your audience. The merits of the material are chiefly these:—Great similarity of result to buono fresco, which it approaches so nearly as to deceive anyone not conversant with the practice of painting. Great scope of colour, as it embraces the whole oil palette, and is not subjected to any of the limitations which are peculiar to fresco. Great facility of manipulation, admitting of washes, impasto, and glazing within the space of a very few hours. Little or no change in the drying, not more than in water-colour drawing, on absorbent sketching paper, Harding's, for instance. Facility of re-touching, as the surface is always soluble in spirit, though proof against water. The only point in which it is inferior to real fresco, is in the absence of that pure crystalline quality of light so peculiar to the latter. On the other hand, it has, in a great degree, that other quality of fresco, which is the Alpha and the Omega of all grand monumental work—gravity—dignity."

The Chairman added that he had ventured to call the attention of the meeting to these letters because they showed there were other means of painting, which artists of great distinction believed to be safe and satisfactory, and by means of which great works of art for decorative purposes might be executed without fear of decay. He thought the subject of such vast importance, that he hoped this meeting would give attention to the excellent suggestion of Mr. Atkinson, that some committee should be appointed to inquire into the subject. The committee appointed by the government had ceased their labours, but there still seemed to be so much doubt on this question, that it would be a pity that fresco painting should be abandoned without a full and fair inquiry. He would therefore enforce as far as he was able, the suggestion that this Society should appoint a good practical committee, in conjunction with the Institute of British Architects, the Royal Academy, and other bodies, who might go carefully into the subject. He concluded by moving a vote of thanks to Mr. Atkinson for his paper.

The vote of thanks was then passed.

Mr. Atkinson said he was prevented by the lateness of the hour from making his reply. His review of the preceding discussion would be given in the form of a letter in the *Journal* of next week.

The paper was illustrated by cartoons and actual frescoes, executed by Mr. Armitage, and kindly lent by that gentleman; also by a selection of reproductions of frescoes in chromo-lithography, produced for the Arundel Society, as well as specimens of the various pigments and other materials employed in the process of fresco painting.

The Secretary announced that on Monday evening next, at 8 o'clock, Mr. Burges would deliver the second lecture of his course, on "Art applied to Industry;" and that at the meeting on Wednesday evening next, a paper by Dr. Edward Smith, F.R.S., "On Public and Private Dietaries" (a sequel to the paper read on the 16th December last), would be read.

The following letter has been received:—

Sir,—Regarding frescoes and the materials used, a great deal might be said, even upon the Italian specimens and their decay; yet it is marvellous how long some have stood in exposed situations, where there is much damp, as in the valleys near the Swiss mountains, not that the climate there is like our humid one, where the lichens grow and decay so rapidly, eating their way into stone. Fresco, in England, can only be used for interior decoration, and even then the surface, so charming from its quality of not absorbing light, becomes deteriorated immediately by coal smoke, which it holds with great tenacity, making the mural pictures of the British artist —who gives more effects of light and shade than are to be found in Italian specimens—soon look black and dingy. As the Italian developed and used a material well suited to his climate, so ought the Englishman to find something better suited to his own—harder in surface, deeper, and impervious to damp, without glitter or absorption of light. The last and lowest school of art, the Dutch or Flemish, matured chiaroscuro, depending upon it for power; pigments on plaster they let alone, having a climate like ours. For colour and effect mosaic cannot compete with fresh fresco, though the former is well suited to our climate, being ten times as durable as the latter. Mosaic is not skin deep, and can be often cleaned without detriment. It has its drawbacks, but is capable of much grandeur and breadth of effect. The most enduring works of art in England are those of the Romans in mosaic—fresh and beautiful. If some one, conversant with the subject, would read a paper before the Society on mosaic as a mural decoration, he would confer an important benefit on the arts, and, perhaps, extend the use of a material well suited to any and every climate.—I am, &c., John Leighton.

Proceedings of Institutions.

Bradford Female Educational Institute (Yorkshire Union).—The annual meeting was held on the 29th January; Mr. Ald. Brown, the president, occupied the chair. The annual report says that during the past year the total number of members has been 559, against 493 in 1862. This increase has been chiefly in young women between the ages of twenty and twenty-five. The members comprised 210 weavers, 201 spinners and other factory workers, 95 nurse maids at home, 22 domestic servants, 10 dressmakers, 2 bonnet makers, 7 sewing-machine minders, 9 employed in shops, 2 French polishers, 1 piece-board paperer. Out of the 207 new members enrolled in 1863, 73 could neither read nor write, 42 could read and write very imperfectly, 57 could read moderately and write a little, 21 could read well and write moderately, 14 could read and write well, 170 had no idea of spelling, 115 knew nothing of arithmetic. Seven classes for elementary instruction had been in operation. The needlework classes were in a very satisfactory condition. The library exhibited a falling off in the number of volumes issued, as compared with the three previous years; the greatest decrease, however, being in works of a light character. The financial statement showed an income of £229 18s. 10d., and an expenditure of £217 8s. 11d.

Farnham Young Men's Association.—On the 29th ult. a lecture was delivered by the Rev. J. M. Sumner, M.A., Rector of Buriton, entitled "A Walk into Spain as far as Madrid." The Lord Bishop of Winchester presided. A vote of thanks was passed to the lecturer.

Faversham Institute.—Local Competitive Examinations have recently been held, at which prizes of books, varying in value from 20s. to 5s., were awarded in arithmetic, English grammar, composition, English history, reading, writing, and other subjects.

Gosport Literary Institution.—The Rev. E. L. Berthon, Vicar of Romsey, recently delivered a lecture on "The Sun." The chair was taken by Dr. Kealy, the president. The lecture was illustrated by diagrams of the subjects brought under the notice of the audience. At its conclusion, H. P. D. Cunningham, Esq., moved a vote of thanks, which was seconded by T. H. Field, Esq., and passed enthusiastically.

Leeds Mechanics' Institution.—The annual meeting was held on the 29th of January, Mr. Ald. Luccock, the president, in the chair. The report stated that all the departments of the Institution were in a satisfactory state, and that there was an increase of twenty-five members. During the year there had been 40,970 issues of bound books, and 3,797 of periodicals. Twenty-six lectures were delivered during the year; nine were on general literature and philosophy, nine on science, abstract and applied, and five on the drama and music. The attendance on all occasions was good. In the boys' school the number of pupils had increased from 162 to 188. In the examinations by the Universities of Oxford, Cambridge, and Durham, the Royal College of Surgeons, the Science and Art Department, and the Society of Arts, the results had been highly satisfactory. Nine were successful at the University of Oxford; of these, three obtained the title of Associate of Arts; twelve were successful at Durham; seven obtained the title of Literate of Durham; two were successful at the Royal College of Surgeons, and obtained the Diploma of Membership. The results of the examination of the Society of Arts have already been published. In the report of the Leeds School of Art it was stated that the numbers of pupils, of all classes, under instruction had been steadily increasing, and had risen from 3,166 in the year 1862 to 5,936 in 1863; whilst the attainments of the pupils, as tested in the public examinations, had increased in a still more favourable degree. The above number included 5,001 children of public schools; 587 pupils in middle class schools; 37 teachers and pupil teachers; and 348 students of the Central and Branch School of Art. During the past year two branch Schools of Art had been opened, under the same management and masters as the Leeds School. At the annual public examination of the pupils of the Leeds School, held by an Inspector of the Science and Art Department, at Leeds, Bradford, Huddersfield, Keighley, and Keswick, 601 pupils passed a successful examination. Twenty-nine medals were awarded to Leeds, six to Holbeck, and six to Keighley, making a total of 41; whilst the school also received a national medallion for mechanical drawing at the national competition in London, and one honourable mention for a chalk drawing from the cast; 15 students also passed the Society of Arts examination in freehand drawing, and obtained certificates. The plans for the new School of Art, in conjunction with the Mechanics' Institute, had been examined by the Science and Art Department, and, with the exception of a few trifling features, had been approved of. The account showed a balance in favour of the Institution of £250, the balance in favour of the new building being £2,288. Mr. T. Dawson mentioned some interesting facts as to the financial results of the operations of the various branches of the Institution during the year. Upon the Institute, distinct from the other departments, there was a loss of £74, but £42 of this was a loss upon catalogues. There was a profit of £17 on the girls' school, and £42 had also been expended in fitting up the new school-room, or the profit would have been larger. On the boys' school there was a profit of £106; whilst upon the School of Art there was a loss of £88, but £73 had been expended on desks, which would be available for the new building. The evening classes showed a profit of £4.

Manchester Mechanics' Institution. — A meeting was held here on the 20th January, to witness the distribution of the prizes and certificates awarded by the Society of Arts to the successful candidates at the last examination. The chair was taken by W. Fairbairn, Esq., LL.D., F.R.S., the president of the Institution, who expressed his satisfaction at the high position taken by the students of the Institution. The prizes were distributed by Sir J. C. D. Hay, Bart., who said he felt it to be a great honour to be permitted to present to the successful students the prizes which they had so well deserved. The very high character which those candidates had earned for themselves reflected the highest credit on their teachers, to whom the hearty thanks of every Englishman were due for the admirable manner in which they devoted their time, often almost gratuitously, to the education of others. The prizes which he was about to give to the successful would be in days to come objects which would rekindle feelings of fond attachment to the place where they had received their education, and would be marks of honour to be handed down to their families. The advantages generally which the country had gained from the bestowal of the prizes of the Society of Arts must be patent to all. The accuracy of thought required in the examination, by putting to the test of writing the knowledge of each competitor, and the impartiality of the examination, must be of the highest value to the students.

Marlborough Improvement Society.—A lecture was recently delivered by Mr Allen Curr, entitled, " The Sea—a Highway, a Battle Field, and a Grave."

Royston Institute.—The annual meeting was held on the 11th January. F. N. Fordham, Esq., in the chair. The report stated that at the last annual meeting considerable alterations were made in the subscriptions of the members, mainly with a view to the increase of the revenue of the Institute. The Committee think the result may be looked on as satisfactory. The income of the year, including a balance in hand at the commencement of £11 9s. 1d., amounted to £90 17s. 6d. The expenditure amounted to £89 4s. 3d.; thus leaving a balance in hand of £1 13s. 3d. The members in 1863 consisted of 31 life members, 6 honorary members, 45 ordinary members subscribing for reserved seats, and 104 ditto subscribing for non-reserved seats; total, 186—25 of these members also subscribed to the drawing classes. In 1862 there were 172 members and 57 subscribers to the lectures and reading-room. The financial result of the two years, so far as the sale of members' tickets and non-subscribers' tickets to lectures is concerned, was—in 1862, £57 9s. 5d.; in 1863, £68 19s. 1d. Twelve lectures and entertainments were given during the year, among which were one by Mr. H. Coxwell, on " His Scientific Ascents with Mr. Glaisher in his Mammoth Balloon;" one by Mr. Waterhouse Hawkins, on " The Gorilla, &c., contrasted with Man;" one by Mr. Basil Young, " Shadows on the Wall, or the Funny Side of Human Nature;" one (gratuitous) by the Rev. W. J. Beamont, M.A., on " Art, Artists, and Artisans;" one (gratuitous) by the Rev. T. R. Birks, M.A., on " Matter and Ether;" one by Elihu Burritt, on " The Physiology of Nations;" and one by George Dawson, on " Ill-used Men." The library has been increased by the addition of 63 volumes; 56 were purchased. The number of volumes issued during the year was 1,797. The most important step of the Committee during the year was that of union with the Cambridge School of Art, in the formation of classes for drawing, modelling, and painting. The Committee hope the number of the members of the drawing classes will increase, so that the fees paid will meet the demands of the Cambridge School of Art. At the recommendation of the Cambridge School, the Committee have decided on collecting a fund for the special expenses of this branch of the operations of the Institution.

Fine Arts.

The Statue of Her Majesty, to be erected at Aberdeen, and placed near that of the Prince Consort, is to be the work of Mr. B. Brodie.

Photographic Exhibition.—The forthcoming exhibition of the Photographic Society will be held in the Gallery of Female Artists in Pall Mall, and will open in the second week in May, closing in August. Members of the Society exhibit free of charge, but non-members will be charged a rent for space.

Wood-carving.—Mr. George Lock has addressed a letter to the *Building News,* in which he makes some suggestions for the more general application of this art to articles of every-day use. He regrets that " hitherto, in the department of artistic and carved toys, ornaments, and the articles of every-day use before enumerated, the French, Swiss, and Germans have, for taste and cheapness, maintained for centuries a pre-eminence," and expresses his belief that " the people of this country are in every way competent to execute what has hitherto been imported from abroad. If this were to be done, many thousands would be pleasurably and profitably employed in the production of carved works for the million. The efforts made to meet the competition and demand hitherto, have been solely of an individual character, rarely attended with even moderate success. This has resulted from the exceedingly contracted view taken of the matter, and the limited pecuniary and artistic resources brought to bear on the undertaking, which, had it been carried out in the same manner as some manufactures have, would, no doubt, have been equally as progressive and profitable as china and glass making, or metal working." He thinks " there can be no reason why, under proper guidance, large factories might not be solely occupied in the production, by children, of simple carved articles, whilst adults, male and female, might be separately employed in the production of the endless variety of goods which the present markets call forth from foreign establishments. With adequate funds, moderate-rented workshops in the metropolis or the provincial towns, first-class management as regards the subdivision and economic use of labour in adults and children, as is shown in the best-conducted mills, factories, and foundries, a first-class artistic staff to design and model the patterns with which to start, some experienced foremen or workmen from the factories and rural districts in which such a class of work has hitherto been produced abroad, with a few of the best English carvers accustomed to work for the commercial markets (like the knife-handle and bread-platter carvers of Sheffield, and the bog-oak jewellery carvers of Ireland), likewise some of the best-trained Parisian furniture carvers for the best kind of work, many hundreds of hands might be immediately taken into profitable training, and an impetus given to the art that it has yet never known in this country. Thousands of our own female peasantry have been taught straw-plaiting, lace-working, &c., which is carried on daily in the village homes of many counties, and much of the artistic toy-carvings now supplied to our shops from foreign parts might be produced by the same class of workers."

Manufactures.

ELECTRO-METALLURGY IN PARIS.

It has been said of Napoleon III. that, like the Roman Emperor, he found his capital of bricks and he left it marble; it may with truth be said that he found it of iron and will leave it of bronze. There is no feature in the recent improvements of Paris more remarkable than the substitution of the latter for the former metal, as far as the eye can judge, and it is impossible that a careful observer should have passed across the beautiful Place de la Concorde, or Place Louvois, or along the principal streets and the Champs Elysées, without having noticed the change in the appearance of the fountains and the still greater one in the lamp-posts, or candelabra, during the last year or two.

The whole of the changes are due to the exertions of M. L. Oudry, the principal of the Usine Electro-Metallurgique d'Auteuil, seconded by the approbation of the Emperor and the aid of the Prefect of the Seine. The works in question are situated in the Route de Versailles, just beyond the bridge of Grenelle, and may be reached comfortably in a quarter of an hour by the American railway from the Place de la Concorde; and a foreigner making a proper application by letter would find little difficulty in obtaining admission. M. Oudry's productions include every kind of deposit with the aid of electro-galvanism, but his chief aim is the coating of objects in cast and wrought iron with a thick and proportionably durable deposit of copper. His experiments with this view commenced in 1854, and in the following year he was rewarded with a medal by the jury of the Universal Exhibition.

At this time he had only operated on wrought iron and small castings, and when he attempted to put his method into practice on a large scale he found that the presence of foreign substances and other peculiarities of cast iron gave him infinite difficulty. In fact, the same treatment which succeeded with wrought-iron articles totally failed in practice with those of cast metal. The mode at first tried by M. Oudry was to give the casting, after it had been very carefully cleaned, a thin coating of copper in a bath of cyanide of copper and potassium; but the coating thus obtained was not thick enough for practical purposes, therefore the objects were afterwards treated in a bath of sulphate of copper, and left under the influence of the voltaic action for periods varying from five to fifteen days. This plan answered admirably with small articles, such as spikes for ship-building, and screws, but failed completely when applied to large surfaces of cast-iron. Cavities which were not completely coated by the action of the first-named bath were immediately attacked by the strongly acidified-solution of the second; and this being the only kind of bath that M. Oudry had found capable of throwing down a thick deposit of copper on an iron surface, he was driven to the conclusion, after months of anxiety and a large expenditure of money, that the direct deposit of copper on iron was, if not impossible, at any rate impracticable. As an instance of the probation through which he had to toil, M. Oudry mentions a case of three iron chimney-pieces, over which he spent six months' time and 17,000 francs, and which he was obliged to abandon at last.

The method which he finally adopted was that of covering the castings with two solid coats of oil-colour and then dressing them over very carefully with plumbago; and with this system, and without any preliminary scraping or cleaning, he is enabled to obtain a coating of copper varying from one to two millimetres in thickness; the former, about one twenty-fifth of an inch, being considered sufficient for all ordinary purposes. The works at Auteuil have now been in full action since 1860, employing constantly from a hundred to a hundred and fifty workmen, and the results may be seen in any of the great thoroughfares of Paris, as, for instance, the now bronzed fountains of the Place de la Concorde, the Place Louvois, and the Champs Elysées, the large rostral columns and candelabra of the first-named place, and those around the Arc de Triomphe de l'Etoile, and eight or nine thousand lamp-posts, of a new and elegant pattern, to be seen on the boulevards and in the principal streets of the city. The consumption of sulphate of copper at this establishment is said to be about 3,500 tons per year. The two great fountains of the Place de la Concorde alone consumed 850 tons. As regards cost, the following are the figures furnished by M. Oudry: The new bronzed lamp-post adopted for the city of Paris is about nine feet high, weighs about 500 lbs., and costs 95 centimes the kilogramme, or about 4½d. per lb., when finished and mounted; total, nine pounds sterling; whereas a similar pillar in bronze, of half the weight, would cost about thirty pounds. The number of these pillars to be supplied for Paris alone is fifteen thousand, and the difference between their total cost in M. Oudry's bronzed iron and in true bronze is set down at £317,100.

M. Oudry does not confine his operations entirely to the coating of ornamental castings. He is now engaged in covering armour plates for vessels of the Imperial navy, with a deposit of copper the twelfth of an inch in thickness, and the small specimens exhibited certainly promise a very favourable result. He has also nearly executed one of the most remarkable galvanoplastic works yet performed, namely, the reproduction in copper of the bas-reliefs of Trajan's Column at Rome, from casts taken in plaster at the cost of the Emperor. This immense work is just completed, and consists of nearly five hundred pieces, presenting a surface of about seven hundred square yards. It is said to be the intention of the Emperor to have the whole arranged in sections, each about twelve or fifteen feet high, in the Museum of the Louvre.

M. Oudry's galvanoplastic works are very low in price as compared with the true bronze, but still they are not cheap enough for all purposes, and there is this difficulty, that the work cannot be done *in situ*. He has, therefore, invented another system, which deserves mention, as it has been applied, in many instances, in this and other towns. It consists in a new kind of bronze paint, composed of pure copper, thrown down by the galvanic process and afterwards reduced to an impalpable powder by means of steam stampers, in a vehicle having benzine for its basis. It is treated like ordinary paint, and the bronzed effects are produced by means of dressing with acidified solutions and powders composed of pure copper. A good instance of its application may be seen in the balconies of the Théâtre Français, which were thus painted about fifteen months since. It is difficult to distinguish at first sight this imitative work from M. Oudry's galvanoplastic coating, and it is calculated to last eight or ten years, while its cost is not a sixth of that of the other. The expense of painting one of the pillars already mentioned is about one pound, and three years' exposure in the open air does not seem to have produced any deterioration whatever in the appearance of the surface.

It should be mentioned that M. Oudry not only employs this benzine oil, or medium, in bronze painting, but in all his work, and has also introduced it into the trade as a substitute for linseed and other oils to which he declares it much superior, especially where there is danger from humidity, whether applied to metal, wood, stone, or plaster.

Commerce.

French Imports and Exports.—The official returns lately published by the Director-General of Customs relating to the imports and exports of France during the year 1863, show that the articles of which the importation has increased are raw hides and skins, wool, preserved meats, silk, tallow, guano, seeds for crushing, sugar, coffee, timber, woollen thread, and woollen cloth. The importation which has remained stationary refers to such articles as cheese, butter, olive oil, cocoa, dye stuffs, cabinet work, and flax. There is a diminution in dressed feathers, rice, corn, and, greatest of all, in coal. The value of the raw cotton imported into France in 1863 is estimated at 177,000,000f., against 126,000,000f. in 1862, and 270,000,000f. in 1861. English manufactured goods, which, according to the Protectionists, were to have driven all others out of the French markets, are becoming less every year. The cast metal imported into France from England in 1862 was estimated at 22,000,000f., and in 1863 at only 18,000,000f. Iron in 1862, 22,889,000f.; in 1863, 4,709,000f. Cotton cloth in 1862, 14,000,000f.; in 1863, 7,926,000f. Woollen cloth in 1862, 40,961,000f.; in 1863, 32,091,000f. There has been an increase in the value of the following articles exported:—Wrought silk, woollen, cotton, linen and hempen cloth, woollen and flaxen thread, dressed hides, edged tools, toys, books and engravings, paper and pasteboard, china and delf, millinery, wine, brandy, soap, sugar, fruit, eggs, corn, wool, dressed feathers, perfumery, and silk. There was a diminution in the exportation of chymical ingredients in 1863, though the duty on salt employed in their preparation was removed. The duty paid on the merchandise imported into France in 1861 amounted to 126,700,000f., in 1862 to 152,300,000f., and in 1863 to 166,200,000f. The most productive import duty is that on sugar; the next that on coal and coke. Next in succession come woollen cloth, cast metal, fruit, corn, linen cloth, cocoa, and machinery.

Sugar Statistics.—The production from all sources, including beet, for 1863, was about 1,900,000 tons, and it is thought that the aggregate deficiency for 1864 will not be less than 200,000 tons, or about ten per cent. on the total production. The recent accounts from the East show that large shipments are making at Mauritius for Bombay, and that the Chinese are drawing heavily on the Manilla crops. Still the stock in Jamaica continues in excess of previous years, being 192,000 tons against 154,000 tons in 1862, 130,000 in 1861, and 106,000 in 1860. The consumption is progressing satisfactorily, and there is a fair demand for export for both the Continent and America. The following tabular statement shows the export of sugars from producing countries in 1863, and probable production for 1864:—

	Tons, 1862-3.	Probable tons, 1863-4.
Cuba	450,000	420,000
Porto Rico	67,000	60,000
Brazil	115,000	85,000
French colonies	111,000	100,000
Dutch Antilles	18,000	18,000
British West Indies	195,000	115,000
East Indies	22,000	——
Mauritius	59,000	59,000
Java	99,000	95,000
Manilla	35,000	25,000
Louisiana	115,000	25,000
Beetroot produce:—		
France	144,000	130,000
Belgium	25,000	25,000
Zollverein	100,000	100,000
Russia and Austria	90,000	60,000

The deficiency being very considerable.

	Tons.
While the East Indies, instead of exporting, will import	20,000
Bombay and California will consume the more	20,000
England will increase her consumption owing to lower duties on tea, by about	20,000
Deficit in stock in France	3,000
Deficit in stock on the Continent	8,000
Loss by fire in the stores of Regia	12,000
Total	83,000

Messrs. Corrie and Co.'s circular says:—In our previous statement of the probable deficiency of some of the crops this year, the estimate of the falling off in Mauritius was put down as 30,000 tons; but subsequent advices from that island report the yield as not likely to exceed 100,000 tons in all, which is about 57,000 tons less than last year; and it is still expected that the production in Reunion will be 40,000 tons short. The quantity at present afloat to the United Kingdom from Mauritius is only about 7,000 tons against 17,000 last year, whilst from Manilla there are only 5,000 tons now on the way, against 24,000. The arrivals in Great Britain for the first month are very small, being nearly 20,000 tons less than the landings in January 1863. Deliveries for export shew an increase of 1,300 tons for the month, but for home consumption there is a diminution of 7,400 tons. The imports, however, being so small, there has been a considerable reduction in the stocks, and the quantity now in the warehouses is only about 11,000 tons in excess of the previous year, while in the chief continental ports the stocks are very much less than last year.

Metropolitan Railway Schemes, 1864.—The Board of Trade have just issued maps with a report on the proposed metropolitan railway schemes. In this report, after noticing that in eight out of 30 cases the standing orders have not been complied with, and remarking on the difficulty of grouping the various bills for apportionment between the committees of the two Houses, the board suggests that two select committees, one from each House, should meet in conference to consider together the matters referred to them, and, if possible, concur in a joint report. They notice that in none of the bills is there a provision for securing a month's public notice at the spot of the intention to take houses inhabited by the labouring classes. There is no scheme to create a central station, though the erection of several stations is proposed. The report enumerates the various schemes designed to meet the recommendations of the select committee of the House of Lords, that there should be a railway across the Thames on the eastern side of the metropolis, to connect the railways north and south; and that additional railway communication should be provided in the densely-populated parts of the metropolis, and a connection between the main lines, where not already in existence, should be established. The report states that these objects would be in a more complete manner effected by certain schemes designed for giving effect to the recommendation of the committee of an inner and outer circle of railway within the metropolitan district, communicating with the principal main lines of railway coming into the metropolis for distribution of the passenger traffic, the outer circle in its course intersecting and communicating with the principal lines of railway north of the Thames. For the outer circle, the Metropolitan District Railway seems well adapted to meet the views of the committee. The circuit may be taken as commencing at Battersea, by junctions with the London, Chatham, and Dover, and the London, Brighton, and South Coast Railway, whence it runs to the Thames, which it crosses at Chelsea by a bridge. It then proceeds to Brompton, where it joins the portion of this scheme called the inner circle, and throws out a branch to the West London Railway. From Brompton it proceeds through South Kensington and Kensington in a line parallel to Church-lane, close to which it crosses Notting-hill, and by Pembridge-gardens and Ledbury-road to near Kensal New Town, where it throws out branches to the Great Western and the Hammersmith and City Junction Railways. The line then proceeds through Kilburn, where it throws out branches to the London and North Western Railway, and a little further on, to the Midland and Hampstead Junction Railways, through Kentish Town, where it again throws out a branch to the Hampstead Junction, through Lower Holloway, where it throws out branches to the Great Northern, through Stoke Newington, where it throws out a branch to Stamford-hill, and through Clapton to Hackney-wick, where it throws out branches to the North London. From Hackney-wick it proceeds by Bow, where it joins the Great Eastern, to the Thames at Limehouse, which it crosses by an arch of 750ft. span, and 130ft. above high water in the centre. It then passses by the docks in Rotherhithe to the railways of the South Eastern and the London, Brighton, and South-Coast Companies in the neighbourhood of New-cross. The remainder of this outer circuit between New-cross and Wandsworth-road would be supplied by authorised lines of the London, Chatham, and Dover, and the London, Brighton, and South-Coast Railways. The

Metropolitan District Railways, besides forming the outer circuit just described, propose to construct an inner line, which, branching from the outer line at Brompton, and proceeding through Pimlico, passes near the Victoria Station, and then along the Thames embankment, passing near the Charing-cross Station to Blackfriars-bridge; thence near the intended Earl-street and Cannon-street Stations to Tower-hill, where it is designed to form a junction with the proposed extension of the Metropolitan line to that place. The remainder of this inner circuit would be supplied by the Metropolitan Railway, and its authorised extension to Finsbury-circus, and its extensions to Trinity-square, at the east, and to Notting-hill and Brompton at the west, proposed by the Metropolitan Railway, Notting-hill, and Brompton Extension, and the Metropolitan Railway, Trinity-square, Extension Bills. The portion of the Metropolitan District Railways just described takes the same or nearly the same course with a portion of the Metropolitan Grand Union, a line which, according to the deposited plan, seemed also to have been designed to meet the views of the committee by the formation of an inner circuit. This line would commence by a junction with the West London at Kensington, whence it proceeds in a subway to and under Sloane-square, and so on to near the Victoria Station. From the Victoria Station it runs nearly parallel with Victoria-street to Westminster-bridge, thence through the Thames embankment to Blackfriars-bridge, thence in a line lying to the south of Cannon-street, and passing near the Fenchurch-street Station to a point near the Metropolitan Railway at Finsbury-circus. The circle is then completed by the Metropolitan Railway, and its authorised extension to Finsbury with one exception. By the Metropolitan Grand Union Railway Bill branches are proposed to the London and Blackwall; the North London Extension at Liverpool-street; to the proposed extension of the Great Eastern line, a short distance north of Wormwood-street; to the lines at the Victoria Station, Pimlico, and from a point near Tower-hill to the South-Eastern and the Brighton Railways on the south side of the river, which is crossed by a bridge near the foot of Tower-hill. The Charing-cross Western and the Charing-cross Northern, taken in connection with each other, would in some degree serve the purposes of an inner circuit, by uniting the Charing-cross Railway with the West London Railway at Kensington, passing near the Victoria Station, Pimlico, at the west, with the termini of the Great Northern, the Midland, and the London and North-Western Railways at the north, as well as with the stations of the Metropolitan Railway. The connection so proposed with the City, instead of being formed by a line running along the Thames Embankment (north side), as in the case of the inner circuits previously mentioned, is effected by crossing the Thames at Lambeth, and then by means of the portion of the Charing-cross Railway on the south side of the river, and its extension across the Thames to Cannon-street. It has been strongly pressed on the consideration of the Board of Trade, by the Directors of the London and North-Western Railway Company, that the object aimed at in the suggestion by the Lords Committee for the construction of an outer circle of railways within the metropolitan district might be accomplished by means of the lines already constructed or authorised, if due facilities were afforded and arrangements made between the existing companies for that purpose; and they expressed their readiness to unite with all the necessary parties interested in the interchange of facilities, on equal terms, and in such arrangements as may conduce to the public convenience and the mutual advantage of the several companies. In this way it was urged the unnecessary expenditure of a large amount of capital might be spared, and the extreme inconvenience to which the whole neighbourhood is exposed during the construction of a metropolitan line might be avoided. After enumerating the schemes which would effect communication between railway termini, the report remarks upon those which would use new embankments or streets, block up those already in existence, or otherwise interrupt, temporarily or permanently, the street traffic. Great inconvenience would, no doubt, be caused to the occupants of houses in the streets interfered with. The Board suggest that some provision should be made to compel the removal of abandoned works, and that the deposit-money should be applied for that purpose, instead of being forfeited to the Crown. The Institution of British Architects have prepared a petition for presentation to Parliament, saying that they have observed with considerable alarm the schemes, nearly eighty in number, for constructing railways and other important works in the Metropolis and its neighbourhood, and pointing out that few of these projects have reference to the general and systematic improvement of the metropolitan lines of street communication, but are chiefly propositions for the junctions of certain lines of railways, originating in private enterprise for partial benefit. As no adequate street thoroughfare communications have been or are proposed, whereas it has long been felt by the commercial interests and the public in general, that the arterial communications through the Metropolis are no longer adequate, they desire the appointment of a Parliamentary Committee, or Royal Commission, to draw up a comprehensive plan for efficient and ample lines of street communication, and that the consideration of all the railway schemes proposed be deferred until such a plan shall have been determined upon. They suggest whether the railways in connection therewith might not be called upon to contribute towards the cost of carrying it into effect. The possibility of rendering these various projects conducive to the provision of suitable dwellings for the labouring classes, and affording them better access to more comfortable and healthy residences in lieu of those destroyed by such operations, as well as the doing away with all private bars or gates in the streets and the buying up all bridges, now held by companies or individuals, and throwing them open for public use, are also questions brought forward for the consideration of any Commission that might be appointed.

Colonies.

Tobacco Plants.—A Maitland paper states that mildew has recently made its appearance in the tobacco plants in some districts to a damaging extent.

Iron in New South Wales.—A bed of clay-iron ore has recently been discovered in the Illawarra district, between Balli and Coal Cliff. It lies horizontally embedded between sandstone; and the regular Wollongong coal measures lie a few hundred feet below it. The bed of iron ore is about twenty or thirty-five feet in thickness.

Coal.—A Sydney paper says, the coal-trade of the Hunter is likely to be considerably extended before long. A large firm have it in contemplation to extend their rail as far as Morpeth, and to put some screw colliers on the colonial line.

Silver in New South Wales.—It is reported that a rich silver mine has just been discovered in the vicinity of Reedy creek, at the base of the Dromedary mountain, about six miles west of the river. The exact locality is kept a secret until the ground has been secured.

Wine in Canada.—The culture of the grape and the manufacture of wine are becoming most important branches of industry, not only in the Western States of America, but also in Canada. In the vicinity of Hamilton they have been carried on to a considerable extent.

The Olive in South Australia.—The cultivation of the olive tree is receiving more attention here; it is considered that it ought to form a stated portion of the business of many of the farms. Rows of olive trees in the vineyards give useful shelter, and add to the returns. Many excellent examples already exist in the neighbourhood of Adelaide, and the oil produced is well fitted for consumption. The soil and the dry atmosphere of this colony warrant the expectation of considerable success in the cultivation of the olive.

Society of Arts at Adelaide.—The Committee of Management of this Society were to hold their Seventh Annual Exhibition in December last. The prizes offered this year by the Society were to be twenty-four in number, the highest being £6 6s. for the best oil painting, illustrative of an event in the history of South Australia. The subject was to be original, and painted by a resident in the colony.

The Blacks of Victoria.—An interesting work on this subject has been written by Mr. James Borwick, formerly a resident in Adelaide. It consists principally of facts and theories respecting the Australian blacks, and contains a large amount of information. It describes their early history, physical appearance, character, intelligence, customs, superstitions, language, and several other subjects.

New Pine Forest.—A Hobart-town paper speaks of the discovery of a new pine forest on the banks of the Forth. The timber is said to be of a very superior kind, and answers admirably for boards, into which that already procured has been principally sawn. The only drawback is, that there is no road to the forest, and that a dense scrub interposes between it and the place on which it would be desirable to have the timber sawn up and prepared for shipment. A tramway, or a cheap railway, is spoken of as the likeliest method of overcoming the difficulty.

Wool.—A Hobart-town paper states that the "clip" of 1863 is magnificent in promise. It will be much above the average of anything known in the colony for many years past. For lambing, too, the season has been in the highest degree favourable. The drop will be fully fifty per cent. above that of 1862.

Publications Issued.

The Useful Metals and their Alloys. *Houlston and Wright.* This work includes mining, ventilation, mining jurisprudence, and metallurgic chemistry employed in the conversion of iron, copper, tin, zinc, antimony, and lead ores; with their applications to the industrial arts. The chapters on metallurgic chemistry and assaying are by Dr. Scoffern. Those on mining, mining ventilation, and jurisprudence, were written for the work by a Government Inspector of mines. The chapters on iron and the several processes used in its conversion, have been prepared by Mr. Truran, C.E., author of the "History of British Iron Manufacture," and for many years engineer at the Dowlais, Hirwain, and Forest Iron Works under Sir John Guest and Mr. Crawshay. Mr. Clay, of the Mersey Iron and Steel Works, has described the processes and tools necessary for working malleable iron in large masses, including the details connected with the large wrought-iron gun presented to the nation by that company. The paper on steel manufacture is said to be by a gentleman of great practical experience, who wishes to remain unknown. Mr. Wm. Fairbairn, F.R.S., has contributed valuable information on the application of iron to the purposes of ordnance, machinery, bridges, and to house and ship-building. Mr. Vose Pickett has given a summary of his new system of iron architecture, a subject to which public attention has already been very considerably directed. The chapters on iron working for use and ornament, and the manipulation and construction of ornamental iron work, are by Mr. W. C. Aitkin, of the Cambridge Works, Birmingham. Those on copper, tin, zinc, and antimony, are by Mr. Oxland, of Plymouth, with the exception of the portions on copper and tin mining, which are partly by Mr. Truran, and partly by Mr. Oxland. The work contains numerous illustrations.

The Art-Student, an illustrated Monthly Magazine of the Fine and Industrial Arts, and Guide to their Principles and Practice. No. 1, February, 1864.—(*Hall, Smart, and Allen*). This new serial, of which the first number has just appeared, "aspires," as stated in its preface, "to a place in the studio of the amateur and professional artist, to proffer its aid in every branch of his studies, chronicle his progress, and afford him the means of communicating with his brethren; to unite and bring together students in every branch of the arts, and promote that spirit of friendly rivalry and mutual help which always results in so much real good to the classes and interests concerned."

Notes.

International Exhibition Building.—It is stated that the contractors will have finished the building which is being erected in the Alexandra-park, at Muswell-hill, in March, 1865.

Naval Architects' Institution.—The fourth annual congress of this Institution will be held on the 17th, 18th, and 19th of March, at the House of the Society of Arts. Two meetings will take place each day. Papers will be read on the "Principles of Naval Construction," on "Practical Ship-building," on "Steam Navigation," and on the "Equipment and Management of Ships for Merchandise and for War."

Copyright.—Early this session a Bill for the "Consolidation of the Acts relating to Literary Copyright," will be introduced by Mr. Adam Black, who has been devoting much attention to the subject during the vacation.

Optical Illusions.—Mr. Manning, connected with the establishment of Carpenter and Westley, the well-known opticians of Regent-street, has perfected some ingenious arrangements, founded on the principle of the Dircks and Pepper's Ghost, by which effects of a novel and interesting character are produced, showing how completely the senses of sight and hearing may be deceived. The spectator is introduced into a dark room, when presently a curtain rises, and a vase of flowers appears, which cannot be distinguished from a real object until the operator, from behind, passes his hand through and through it, showing at once that it is a mere phantom. To render the illusion more perfect, a hand plucks a flower from the vase, and throws it on the floor. Punch and Judy next appear, the one a real puppet, the other a phantom, but utterly undistinguishable from each other. The well-known hard knocks are given and taken by both, and though the spectator well knows that there is deception in the sound as to one, at least, he still remains absolutely puzzled as to which is which. Punch in the end exhibits his phantom character by bowing his head to the ground and passing gradually through the floor, literally sinking into the earth. A hand now appears emerging from the darkness, takes up a piece of chalk, and writes on a slate hanging on the wall, in characters absolutely ineffaceable by the operator's hand, which is repeatedly rubbed over them, but which disappear when subjected to the same operation by the phantom hand. A variety of other illusions, which, like those above described, are most perfect in their deception, are given. The whole reflects great credit on the ingenuity of Mr. Manning, in turning to practical account the simple scientific and optical principles involved in the exhibition. It must be added that the exhibition is not got up for profit, nor is it open to the public, but is simply shown for the entertainment of the private friends of the firm, exemplifying what may be effected by the application of very simple means, and that "seeing" must not always be followed by "believing."

Scientific Research.—A scientific expedition round the world for scientific research has been organised in Austria. The *Marco Polo* will leave Trieste, on the 5th of next March, with about sixty passengers, and the voyage is expected to extend over eight months. Two hundred days will be spent on the sea, and fifty in visiting thirty ports which are named as stopping places on the route. The cost of the expedition is defrayed by the passengers, who pay £400 each. The ship has been carefully furnished with instruments and apparatus of all kinds, under the advice of the consuls of the different ports.

THE SOCIETE D'ENCOURAGEMENT.—The City of Paris has voted, out of the municipal funds, an annual grant of £240 to this body.

MEETINGS FOR THE ENSUING WEEK.

MON. ...British Architects, 8.
Medical, 8½. Dr. Edward Smith, F.R.S., "The Rate of Pulsation under the influence of numerous agencies in Health and Disease."
R. Asiatic, 3.
R. Academy, 8. Mr. R. Westmacott, R.A., "On Sculpture."
R. United Service Inst., 8½. Mr. H. D. Cunningham, R.N., "The Application of Steam Power to the Working of Heavy Guns."
TUES. ...Civil Engineers, 8. Mr. Thomas Sopwith, jun., "The Actual State of the Works on the Mont Cenis Tunnel, Victor Emmanuel Railway, and Description of the Machinery employed."
Statistical, 8. Mr. W. L. Sargant, "Some Defects and Results of the Registrar-General's Reports."
Anthropological, 8.
Pathological, 8.
Royal Inst., 3. Prof. Tyndall, F.R.S., "On Experimental Optics."
WED. ...Society of Arts, 8. Dr. Edward Smith, F.R.S., "On Public and Private Dietaries."
Meteorological, 7.
London Inst. 7.
R. Society of Literature, 4½.
THUR. ...Royal, 8½.
Antiquaries, 8.
Linnæan, 8. Mr. H. B. Brady, "On the Rhizopodal Fauna of the Shetlands."
Chemical, 8.
Numismatic, 7.
R. Society Club, 6.
Royal Inst., 3. Prof. Tyndall, F.R.S., "On Experimental Optics."
FRI. ......Geological, 1. Annual Meeting.
Philological, 8.
Royal Inst., 8. Mr. Wm. S. Savory, "On Dreaming and Somnambulism."
R. United Service Inst., 3. Capt. Arbuckle, "The Errors of the Rifle."
SAT. ...Royal Inst., 3. Prof. Frankland, "On the Metallic Elements."

Patents.

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From Commissioners of Patents Journal, February 5th.

GRANTS OF PROVISIONAL PROTECTION.

Aerated liquids, stopping bottles of—225—J. H. Johnson.
Bags, &c., locks for—110—M. Wolfsky.
Barouches, &c., hinge for the heads of—209—A. McKenzic.
Boiler plates, shaping the edges of—3001—J. Fernie and G. Taylor.
Boots, &c., securing trouser straps to—135—E. Mainstone.
Bottles and casks, stoppers for, &c.—179—W. McAdam.
Bottles, jars, &c., closing—173—C. T. Woodman.
Boxes, fancy—185—B. Greenwood.
Brewing copper, steam—101—W. J. Murphy.
Brushes—157—J. G. Hinde.
Buffers—119—J. Gill.
Buttons, manufacture of—223—H. C. Huskinson.
Cannon—141—D. A. Burr.
Carbonates of soda, formation of—3131—E. Solvay.
Casks, &c., stands for—191—J. McElroy.
Chaff, roots, &c., machine for cutting—124—E. Whele.
Chlorine, manufacture of—5—W. Clark.
Cocks or taps—136—R. W. Sievier.
Corn dressing and winnowing machines—205—W. Tasker.
Cotton, &c., opening and carding—127—E. Lord.
Covering land, &c., with earth or soil, machinery for—126—W. Wood.
Cultivating, apparatus for—145—L. J. Cohen.
Curtain hooks—183—J. Edwards.
Daggers, adjusting to revolvers, &c.—130—H. A. Bonneville.
Drays—207—W. Tasker.
Elastic fabrics, ornamenting—103—J. Connell.
Engraving—71—H. A. Bonneville.
Feathers, sorting the down from, &c.—151—J. Hamer.
Fibrous materials, fixing colours on—152—T. Lightfoot, G. P. Barnes, and J. Lightfoot.
Fibrous materials, machinery for combing, &c.—111—W. Tongue.
Fire-arms, &c., tubes and barrels for—108—J. Thompson.
Fire-arms, &c., manufacture of—139—J. Thompson.
Fire-arms, bottles, &c., stopping muzzles of—106—N. Thompson.
Fire-places—128—E. B. Wilson.
Fodder-cutting machine—14—W. Clark.
Fortifications, &c., protection from projectiles—177—J. W. Walton, J. W. Walton, jun., and H. C. Walton.
Galvanic belt—112—A. F. Henery.
Gas lamps—121—W. C. Rogers.
Grain, seeds, &c., machinery for cleaning, &c.—175—J. Mitton.
Hand stamps, self-inking—113—W. E. Newton.
Healds, manufacture of—117—J. Ellis and J. Sladdin.
Heels for boots, &c., moveable and adjustable—102—J. Wadsworth.
Hydro-carbon oils, deodorizing—163—E. T. Jarrold and G. J. Yates.
Jewellery, &c., fastenings for—233—E. Atkins.
Lamps—219—R. Martindale and J. Williams.
Lamps, construction of—107—G. Burt.
Lamps or gas burners, attachment for—146—J. H. Johnson.
Lawn mowing machines—187—J. Shaw.
Lightning arresters—120—D. A. Burr.
Looms—1—J. Holden.
Looms, mechanism of—165—J. Burch and S. Fearnley.
Looms—221—J. Combe and J. H. Smallpage.
Metal, tool for enlarging holes in—155—J. Brown.
Money box—143—B. P. G. de Thorey.
Motive power, combined—125—J. J. S. Mountain.
Motive power, steam, &c.—150—G. T. De Kercado.
Mowing, &c., machinery for—213—A. Brown, L. G. Kniffen, and T. H. Dodge.
Musical instruments—134—W. H. Marks.
Packing for steam engines, pumps, &c.—132—H. Attwood.
Paper, cardboard, &c., ornamenting—197—T. Stevens.
Paper, process of bleaching—203—W. Ibotson.
Pigments, manufacture of—131—C. Vogt.
Piles, machinery for driving—115—L. Bovy.
Pneumatic pump—142—E. J. Vinot.
Projectiles, manufacture of—217—H. Bessemer.
Railway brakes—3083—J. Aubert.
Railway carriages, bearings for the axles of—133—C. A. Beckman.
Retorts and furnaces, for distillation of coal, &c.—109—J. E. Baker
Rivetting machine—123—A. Shanks.
Sack holders—154—J. Davies.
Shafting, &c., construction and lubrication of—116—C. Reynolds and J. Barrington.
Ships, apparatus for propelling—137—P. St. G. Græme.
Ships, combined iron and timber—118—P. Cato.
Ships, &c., steering—181—J. H. Johnson.
Steam boilers, furnaces for—199—J. E. Dix.
Stone, marble, &c., cutting and working—148—J. D. Jobin.
Sugar, sawing and cutting—144—R. A. Brooman.
Tablets, show-bills, &c.—2436—B. G. George.
Tanning machines—161—T. Bayley.
Tilling land, steam engines, &c., for—114—J. Howard, E. T. Bousfield, and J. Pinney.
Traction engines, &c.—201—W. Chapman.
Vehicles, apparatus for alighting from—231—S. Grafton.
Vessels, navigable—171—H. C. Bagot.
Vests, &c., knitted, manufacture of—147—C. Billson.
Washing, wringing, &c., machinery for—211—T. Bradford.
Window sashes, hanging, &c.—138—S. Wynn.

INVENTION WITH COMPLETE SPECIFICATION FILED.

Ploughs, construction of—229—J. Gedge.

PATENTS SEALED.

1970. R. Dickson.
1978. J. T. King.
1982. W. Clark.
2044. J. Broadley.
2080. R. Griffiths.
2096. F. R. Stack.
2114. J. H. Johnson.
2250. W. Clark.
2497. W. T. Bury.
2577. T. Restell.
2663. W. E. Gedge.
2715. David Davy, jun.
2771. L. Barham.
2836. G. T. Bousfield.
2837. T. Harrison.
2870. G. T. Bousfield.
2924. W. E. Newton.
2967. L. Accarain.
2998. M. R. Pilon.

From Commissioners of Patents Journal, February 9th.

PATENTS SEALED.

1884. J. W. Branford.
1976. W. Knowles and R. Halliwell.
1985. Sir J. S. Lillie.
1986. G. Graham.
1989. L. R. Bodmer.
1990. R. Canham.
1991. J. Templeman.
1992. R. S. Newall.
1993. R. Wappenstein.
1994. W. Hudson, C. Catlow, and J. Dodgeon.
1995. R. S. Newall.
2008. C. Schiele.
2010. R. B. Greenwood.
2017. J. Wain.
2018. W. Asbury.
2021. G. Yates.
2022. G. Davies.
2023. E. Scott.
2027. F. Flavell.
2032. R. Lightbown.
2035. A. W. Parker.
2037. A. M. Dearn.
2077. R. Thompson.
2097. H. F. McKillop.
2113. D. Blake.
2143. J. Dodge.

PATENTS ON WHICH THE STAMP DUTY OF £50 HAS BEEN PAID.

451. C. Eyland.
484. J. Howard and E. T. Bousfield.
315. T. Blezard and J. Blezard.
333. C. While.
331. J. Higgins and T. S. Whitworth.

PATENTS ON WHICH THE STAMP DUTY OF £100 HAS BEEN PAID.

331. P. Schafer and F. Schafer.
343. G. Wright.
361. R. A. Brooman.